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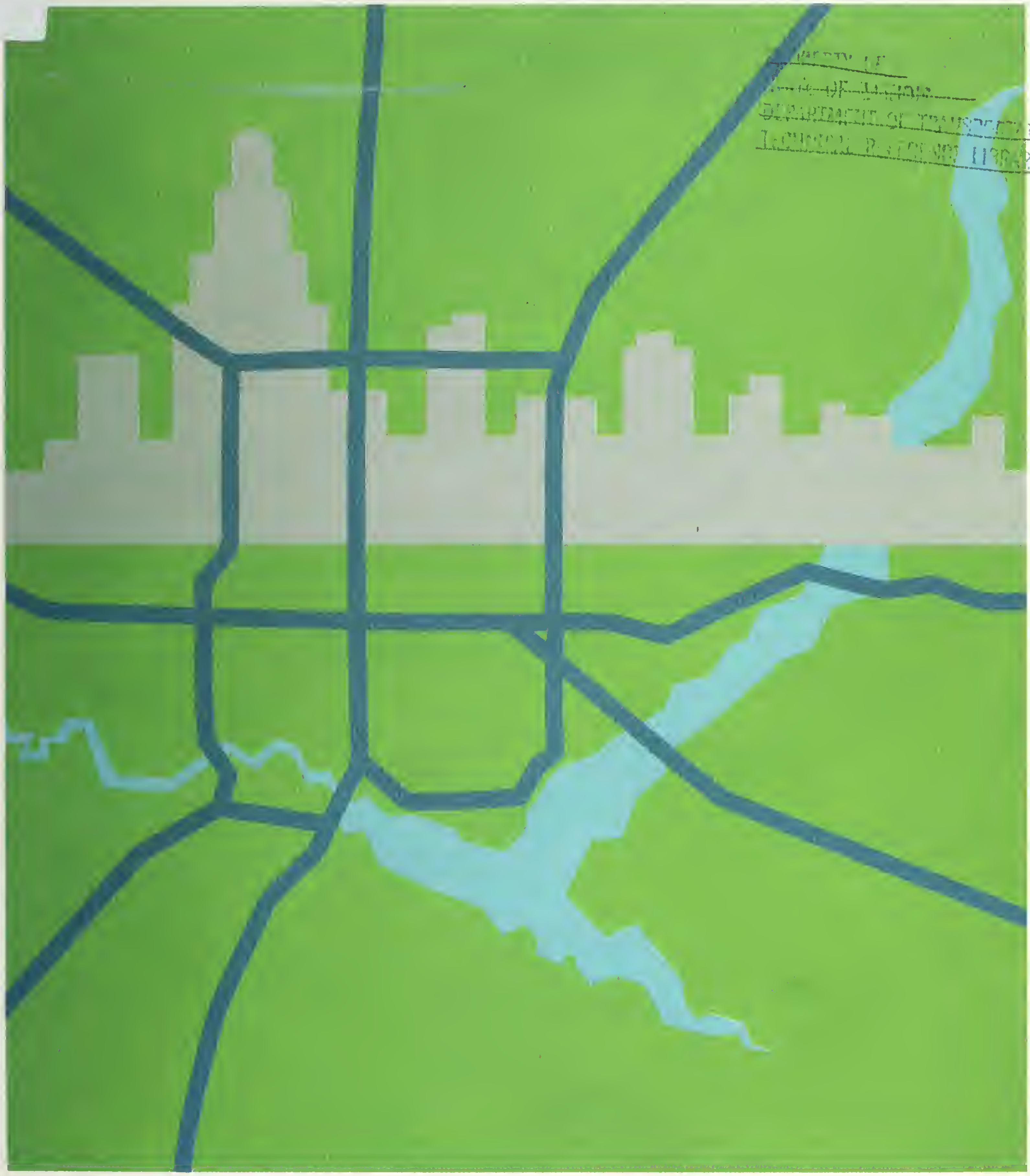

TRANSPORTATION STUDY

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Agencies within the Study Area

STUDY CONDUCTED UNDER THE SPONSORSHIP OF

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  Department of Public Works, William F. Cellini, Director
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In cooperation with:

The United States Department of Transportation, John A. Volpe, Secretary
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DECATUR URBANIZED AREA TRANSPORTATION STUDY

A SUMMARY REPORT

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INTRODUCTION

During the past few decades, numerous advances have been made in the technology of transportation planning. Techniques for forecasting future travel have changed radically with the advent of high-speed electronic data processing equipment. Application of this new technology is only possible after the preparation of input data in an extensive and detailed manner, and it also requires a series of complex analysis processes. This report documents the initiation of a comprehensive transportation planning process for the Decatur urbanized area using this new technology.

The term "transportation planning" as used in this report refers to the planning of a *regional* transportation system which is made up of a variety of facilities for the conveyance of goods or people. Widespread ownership of automobiles has made the condition and efficiency of streets and highways of concern to almost every citizen. Industry also relies heavily on streets and highways, but frequently depends upon rail or pipeline service as well. In addition, a small but significant portion of travel is accomplished via public or quasi-public systems, such as airlines, buses, or passenger trains.

IMPORTANCE OF A TRANSPORTATION SYSTEM

The regional transportation system has major impact on the economic potential of a region. Efficiency of the transportation system is a significant element in the cost of doing business in the region. Consequently, potential sites for business or industrial expansion frequently are evaluated in terms of their accessibility and the condition and capacity of the transportation facilities which make them accessible. A region handicapped by an inefficient or deteriorating transportation system is severely disadvantaged in competing with other regions for new businesses or industries.

Quality of the living environment in the region also is highly affected by the transportation system. The typical citizen desires a system that enables him to travel wherever he pleases with maximum speed and safety. This same citizen might object to the presence of a high-speed, heavily traveled route too near his home, however. Planning of transportation facilities must be sensitive to the need for compatibility of the system with the abutting land-uses which it serves.

Unplanned growth of a transportation system can be deceptively costly. Over the short term, a policy of solving problems as they become critical might appear to be the most economical means of allocating transportation funds, since nothing would be expended for the forecasting of future needs. Such a policy would actually be extremely costly. Breakdowns in the system would lead to higher costs for industrial and business operations, and economic growth would be slowed as new businesses sought regions with more efficient transportation systems. Also, funds necessary for the correction of a critical problem might be extremely difficult to obtain when resources are scarce, requiring that the correction be postponed or financed under unfavorable conditions.

Impetus for the initiation of comprehensive transportation planning processes was provided by the Federal-Aid Highway Act of 1962. Section 9 of this act reads, in part, as follows:

> "It is declared to be in the national interest to encourage and promote the development of transportation systems embracing various modes of transport in a manner that will serve the States and local communities efficiently and effectively. To accomplish this objective the Secretary shall cooperate with the States, as authorized in this title, in the development of long-range highway plans and programs which are properly coordinated with plans for improvements in other affected forms of transportation and which are formulated with due consideration to their probable effect on the future development of urban areas of more than fifty thousand population. After July 1, 1965, the Secretary shall not approve under Section 105 of this title any program for projects in any urban area of more than fifty thousand population unless he finds that such projects are based on a continuing comprehensive transportation planning process carried on cooperatively by States and local communities in conformance with the objectives stated in this section."

NATURE OF THE PLANNING PROCESS

The transportation planning process is a carefully defined program of activities conducted to formulate short-range and long-range transportation system plans. This process does not relieve local officials of the responsibility for making final decisions on the expenditure of public funds, but provides them with information upon which to base these decisions. Long-range planning also is of benefit to private businesses, since they are able to plan developments that will be served adequately by public facilities. Section 9 of the Federal-Aid Highway Act of 1962, excerpted above, establishes three basic requirements for the transportation planning process: it must be continuing, comprehensive, and cooperative.

The comprehensive aspect requires that all phases of regional development be considered in the planning of transportation system elements.

This implies that detailed economic, population, and land-use forecasting will be done, and that future demand for facilities will be projected for all modes of transportation, both public and private.

The continuing aspect requires that planning activities be carried on as a routine operation. Long-range forecasts of regional development are indicative of probable trends, at best, and the demands projected from forecasts of this nature require periodic review and evaluation. This is accomplished by monitoring all phases of regional development so that actual trends may be compared with planning forecasts and the forecasts modified as necessary.

The cooperative aspect requires that each agency responsible for the planning and financing of regional facilities must have a part in the planning process. In the Decatur urbanized area this has been ensured by a written memorandum of understanding between officials of the Illinois Division of Highways, the City of Decatur, and Macon County. It would be extremely difficult for local officials to make reasonable decisions on projects within their particular jurisdiction without full cognizance of projects planned by other jurisdictions. There is another advantage to cooperative transportation planning on a regional basis, in that jointly planned and financed facilities may result in considerable savings to the several jurisdictions concerned.

Major emphasis of the Decatur Urbanized Area Transportation Study was on the development of traffic modeling techniques and preparation of data files necessary to the modeling work. Regional land-use and development planning processes were well established before the initiation of this transportation study. As a result, land-use and socioeconomic projections were based largely on locally available planning forecasts. In the continuing phase of the planning process, land-use and transportation phases of regional development will be planned and evaluated concurrently.

ORGANIZATION OF THE STUDY

An organization chart for administration of the Decatur Urbanized Area Transportation Study is displayed in Figure 1. As noted in Figure 1, directive functions were generally performed by committees composed of representatives of local agencies engaged in the planning and financing of regional facilities. The staff function was fulfilled by a consultant, due to the variety of specialist skills required for traffic modeling phases of the study.

The Policy Committee was charged with responsibility for overall direction of the Decatur Urbanized Area Transportation Study and the establishment of a continuing planning process. Policy Committee members included the district engineer for the Illinois Division of Highways, the chairman of the Macon County board of supervisors, and the mayor of Decatur. Formation of a policy committee composed of local officials provided a key link between the purely advisory function of the transportation

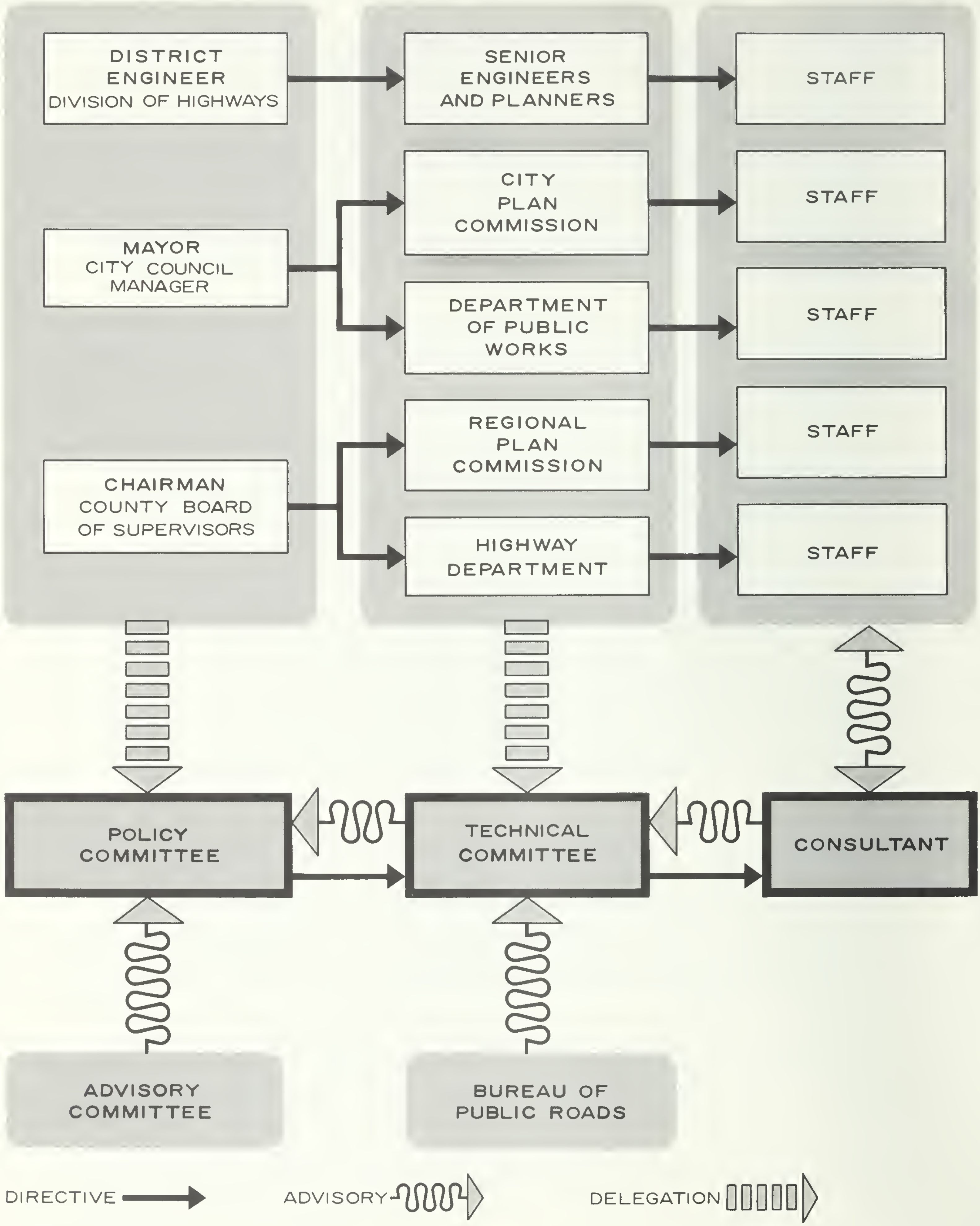

FIGURE 1:
ORGANIZATION FOR STUDY ADMINISTRATION

planning process and the implementation of plan recommendations by approval of local governing agencies.

The Technical Committee served as an advisory group to the Policy Committee. Technical representatives of each of the agencies represented on the Policy Committee formed the Technical Committee. They included representatives of the district office of the Illinois Division of Highways, the Macon County Superintendent of Highways, the Macon County Regional Plan Commission Staff Director, the Decatur City Manager, the Decatur Director of Public Works, and the Director of Community Development. In addition to preparing advisory reports and recommendations for review by the Policy Committee, the Technical Committee also provided technical assistance and data through direction of their respective staffs.

An Advisory Committee was formed for the purpose of providing citizens of the Decatur urbanized area with an opportunity to review study findings and recommendations and to establish a channel of communications with the Policy Committee. The Advisory Committee was made as broad based as possible, so that all interests in the region might be represented. Implementation of study plans is ultimately dependent upon the approval of private citizens. The Advisory Committee guided formulation of policies determining general direction of the transportation planning process, so that planning studies might be attuned to the interests of citizens of the region.

This report presents a summary of analysis techniques and principal findings of the Decatur Urbanized Area Transportation Study. Frequent reference has been made to interim reports in which technical aspects of the study were fully documented. Since this report has been organized in a topical format, activities are not necessarily discussed in the sequence followed in the study.

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REGIONAL DEVELOPMENT FACTORS

CHAPTER 1

An analysis of regional development factors was undertaken so that growth patterns and trends might be projected through the forecast year, 1985. Regional characteristics were inventoried and analyzed in sufficient depth to evaluate their impact on the need for future transportation facilities. Current policies determining regional development also were identified in the form of definitive statements prepared by local officials.

Three general types of regional development are discussed in this chapter. First, economic potentials are evaluated by analyses of environmental features of the Decatur urbanized area and trends in industrial growth by sector. Second, the study of population trends is discussed, including an analysis of growth components, composition, and household characteristics. Third, a synopsis of policies defined by a forum of local officials is presented.

The study of regional development factors provides an essential input to the technical process of forecasting future travel, as well as guiding the formulation of plans. Several statistics quantified for the region as a whole were subsequently used as control totals for the allocation of socioeconomic data to smaller geographic units in the area, referred to as *traffic zones*.

It is anticipated that Decatur and Macon County will continue to grow at a pace similar to that of the period 1945 to 1965, and that the economic face of the area will not change substantially in character. The regional economy is based primarily on manufacturing and the processing of agricultural products. It is anticipated that new skills will be required of the labor force to meet the varying needs of modern technology, however, and that business and professional services will become a more important sector of the economy than in the past.

The forecasts of future travel prepared in this study reflect the regional socioeconomic data listed in Table 1.

Table 1
REGIONAL SOCIOECONOMIC DATA

	1964	1985	Actual Change	Percent Change
Housing Units	41,433	60,000	18,567	+44.8
Total Population	124,300	180,000	55,700	+44.8
Population per Housing Unit	3.00	3.00	0	0 0
Labor Force (Resident)	49,350	71,000	21,750	+44.1
Employment (Resident)	47,920	68,300	20,380	+42.6
Employment (Place of Work)	49,175	74,200	25,025	+50.9
Income per Capita (1957-58 Constant Dollars)	2,145	3,110	965	+45.0
Median Family Income (1964 Constant Dollars)	6,200	9,270	3,070	+49.5
Automobiles	49,628	83,000	33,372	+67.2
Persons per Automobile	2.51	2.17	0.34	-13.5
Trucks and Buses	8,889	15,000	6,111	+68.8

ECONOMIC TRENDS AND POTENTIAL

Macon County has achieved a commanding position in the rich, central Illinois corn belt area. It has evolved from a rural society of prairie settlers in the 1800s, far removed from our nation's major population concentrations, to a closely knit, urban-industrial community located only a few miles from the nation's center of population (Clinton County) in 1960.

Decatur, founded in 1829, and named after the American naval hero, Commodore Stephen Decatur, is the county's geographic center, principal city, and county seat. Like the Village of New Salem, which persists today only as an historic memorial, Decatur is deeply rooted in the Lincoln tradition. It was here that the family of Abraham Lincoln first settled in its move from Indiana to Illinois. It was here also that Lincoln practiced law, made his first political speech (in a downtown spot later called Lincoln Square), was nominated for President in 1860, and subsequently received word of his election as President (at a place where the Citizens Bank now stands).

Today Macon County includes 80 units of local government. In addition to the county itself, there are 10 municipalities, 17 townships, eight school districts, and 44 special districts.

Decatur's geographically centralized location facilitates the economical distribution of products to all parts of the United States and has been cited by several Decatur firms as an important consideration in the decision to locate in the area. Proximity to major regional centers such as Chicago, St. Louis, and Indianapolis also is an important factor.

The types of industries in Decatur reflect the advantages of this location. For instance, the city's location in the heart of the Illinois corn and soybean belt stimulated the large Decatur grain processing industry, including A. E. Staley and Archer-Daniels-Midland Company. Also, many of Decatur's manufacturing industries are engaged in the production of parts for durable goods or the assembly of final products from components produced elsewhere. In the future, final assembly of products may become more decentralized, and the distributional advantages of Decatur's location would become more important.

NATURAL RESOURCES

The most obvious physical features in Macon County are Lake Decatur, the Sangamon River, and the Shelbyville Morraine bisecting the county in the western portion of the urban area. These provide an excellent water supply, recreational facilities, and pleasant homesites. These advantages will be enhanced by the Oakley Reservoir project currently being designed by the U.S. Corps of Engineers. Otherwise, most of Macon County is relatively flat.

Lake Decatur is one of central Illinois' important supply reservoirs, storing surface water. It is associated with the Sangamon-Illinois River system. Water requirements of the population and industry have been increasing rapidly and may be expected to continue to rise. Industrial use of water alone (excluding municipal water supplied to industry) is estimated at 17 million gallons per day. The Oakley Reservoir project will substantially increase the water storage and supply capacity in the Decatur area. This is important to the attraction of industries which may require water as part of their production or waste disposal process.

Lake Decatur is the major recreational resource in the county. Two state parks are important recreational facilities for persons throughout the central Illinois area: Spitler Woods, near Mount Zion, and Lincoln Trail Homestead, near Harristown. Two future developments of importance are the extensive recreational facilities planned for the Oakley Reservoir area and a nature center along the Sangamon River west of the city, for which property is being acquired by the Macon County Conservation District.

Forest and fur resources are not of commercial importance in Macon County. Commercial fishing is of some value, amounting to about 32,000 pounds and $3,000 in 1956. However, this was quite small compared to river and lake catches in some other parts of the state. Lake Decatur and the Sangamon River do provide good sport fishing; also, quail and pheasant hunting is fairly good.

Average annual precipitation in the county is 36 to 38 inches and average annual snowfall 18 to 22 inches. The average annual number of thunderstorms is 48. Temperatures average 28 to 32 degrees in Macon County in January and 76 to 78 degrees in July. Corresponding to the distribution of temperatures in Illinois, the length of the growing season in

Macon County is average for the state, 170 to 180 days--the average date of the last killing frost being about April 21 and the average date of the first killing frost around October 20. The climate is important primarily for its effect upon agricultural activity, although it also contributes to the quality of the living environment in the community and influences opportunities for outdoor recreation.

It is difficult to estimate the future value of mineral resources in Macon County. Their importance is largely dependent upon the technology of extraction, the production of derivative products, and the extent of reserves of these resources in other parts of the nation.

There are three small areas of proved and probable coal deposits. About 228,000,000 tons have been produced since 1882, although none in 1957, the last year reported in the Atlas. It is estimated that coal reserves in Macon County are about 1,235 million tons.

Macon County is in the area where oil discovery is a definite possibility, although it is north of the boundaries of the deep part of the southeastern Illinois basin. Currently, sources show some potential for further development, but it seems unlikely that mining and extraction will become a major activity in Macon County.

More important is the area's excellent access to refined oil and gas pipelines--important in serving future industries. Macon County is on the Chicago-St. Louis pipeline for refined oil products and in 1957 had four pumps or meter stations. A natural gas pipeline also passes through the county, serving the area with a small spur.

Macon County possesses scattered large gravel deposits, several of which are operative. Two minerals which are not commercially produced at present are gypsum and anhydrite. These are present in generally deep deposits in Macon County. Although available technology and the presence of other deposits elsewhere do not allow for economic exploitation of these deposits, the proximity to the St. Louis region makes them potentially important as a source of future building materials.

EMPLOYMENT AND LABOR FORCE

The most important resource affecting the economic development of a community is the size and quality of its labor force. Although technically the potential labor force is defined as all persons over 14 years of age, generally the effective labor force may be considered as all persons who are either employed or seeking employment. In 1960, the actual labor force in Macon County included 56.1 percent of the potential labor force (as reported in the 1960 Census of Population and Housing).

Past trends in resident employment and labor force were studied by a review of decennial census reports for the past few decades. Participation by females in the labor force is slightly lower in Macon County than in the state and nation. Similarly, participation by persons under 25 is somewhat lower than in the nation but higher than in Illinois. The occupational distribution of the labor force in Macon County is similar to that of Illinois and the nation. Growth rates of Macon County residents in professional, managerial, higher-skill manufacturing, and clerical occupations are considerably higher than in the state, however.

In educational quality, measured by median school years completed by persons 25 years of age and over, the Decatur area is above the average for the state, the region, and the United States. Macon County, with a median of 11.1 school years completed in 1960, ranked equal to or above all other SMSA's in Illinois, except Champaign-Urbana.

The economy of Macon County has evolved from agricultural to manufacturing-oriented, with Decatur remaining the primary trade and service center for Macon and portions of six surrounding counties. Employment in the Decatur area is concentrated in the manufacturing and retail trade sectors and has been characterized by steady growth. Total employment of Macon County has increased at an average annual rate of 1.1 percent since 1950, reaching approximately 50,000 in 1965.

Resident employment in Macon County, as a percent of Illinois total employment, has increased significantly from 0.87 percent in 1940 to 1.13 percent in 1960. It has remained stable as a percent of the United States employment, at 0.07 percent. Decatur's share of total employment in the county has decreased from 73.91 percent in 1940 to 67.64 percent in 1960, because of new outlying industries beyond the city limits. Total unemployment in the county was about 2.5 percent in 1965.

Detailed employment statistics were required for the year 1964, so that travel survey data might be correlated with employment data for the corresponding period of time. The Decatur office of the Illinois State Employment Service supplied tabulations of the Macon County labor force, and of employment by two-digit Standard Industrial Classification (SIC) code, for 1964. Allocation of employment data to traffic zones was guided by a tabulation of Illinois Bureau of Employment Security (BES) data, listing employment within general categories for specific establishments in the region. The compilation of zonal employment data required a special survey of establishments not covered by BES records, such as schools, government offices, railroads, and hospitals. Illinois State Employment Service statistics were used as control totals for the allocation of employment data to zone for each of the general employment categories.

In 1964, 84.4 percent of the Macon County labor force was represented by non-agricultural workers. Of this number, 30.6 percent were engaged in manufacturing and 53.8 percent in non-manufacturing activities. The latter group was divided as follows: trade 15.6 percent, services 12.8 percent, construction 5.6 percent, other 19.8 percent, miscellaneous non-agricultural activities 10.8 percent. Agricultural activities accounted for 4.8 percent of the total labor force.

Economic fluctuations in the Decatur area are closely associated with those of the nation. This is mainly due to the large proportion of manufacturing employment devoted to the production of durable goods in the primary metals and nonelectrical machinery industries. Manufacturing diversification and the growth of non-manufacturing industries may be expected to continue in the county. This trend will reduce the dependence of the local economy on the short-term rate of national growth.

Continued technological advance will occur in all economic activities, increasing productivity and altering the training requirements for labor. In agriculture, technological advances will encourage the trend toward larger farms with proportionately smaller labor forces and greater outputs. In manufacturing, the trend will be toward greater automation, with alterations in the requirements for labor, but probably no total reduction in employment opportunities.

Past experience indicates that automation in manufacturing will not radically alter requirements for skill levels in workers. In non-manufacturing activities, the primary impact of technology is on methods of recording and storing information. Again, the kinds of skills required will be altered, but the level of skills and the number of workers is not expected to be decreased.

The study of trends in employment by industrial sector was based on statistics compiled by the Census of Agriculture, Census of Business, and Census of Manufacturers. Data is collected at approximately five-year intervals for each of these censuses. Statistics reviewed for this study ranged over the period 1940 through 1964.

Agricultural Employment

Agricultural employment and the number of farms in Macon County has been declining fairly rapidly since 1940, although the amount of land in agricultural use has been relatively stable. These trends have been accompanied by a steady increase in average farm size, reflecting a pattern of farm consolidation and the advance of technology in farming methods. Compared to the Illinois average, Macon County farms are slightly larger, with a slightly higher average farm income from sale of products. In 1959 the average farm size was 214 acres in Macon County and 196 acres in Illinois. Average product sale income was $12,691 in Macon County and $11,708 in Illinois.

Manufacturing Employment

The number of manufacturing establishments in Macon County declined from 140 to 124 between 1954 and 1963, although the State of Illinois as a whole experienced substantial growth. During this same period, manufacturing employment increased by 12.3 percent in Macon County and by only 2.9 percent in Illinois. However, in Macon County, manufacturing employment decreased by 8.15 percent from a 1958 peak of 13,983. The rates of growth in value added and new capital expenditures were higher locally than in the state. This is reflected in higher value added per employee and a higher new capital expenditure per establishment. These ratios are indicative of the productivity of the labor force and of the incidence of new plant and equipment investment made by Macon County establishments.

Manufacturing employment is heavily concentrated in the food and nonelectrical machinery industries. The fabricated and primary metals industries also are important. Although numerous other manufacturing groups are represented in Macon County, including stone, clay and glass, rubber and plastics, printing and publishing, lumber and wood products, and apparel, none of these industries accounts for more than five percent of manufacturing employment. In several cases, the presence of the manufacturing group is primarily dependent upon one large firm.

Most of Macon County's dominant manufacturing groups also are important in the State of Illinois as a whole, although locally they represent a smaller proportion of manufacturing employment due to a wider and more even distribution among industry groups.

Those sectors of the food products manufacturing group which are represented by manufacturers in Macon County were static in growth nationally over the period 1958 to 1962. Most industries in the fabricated metal and nonelectrical machinery groups were classified as declining industries for that period nationally. However, it is significant that those industries in the above manufacturing groups which were reported to have had medium, high, or very high growth rates nationally and do occur in Macon County are represented by one or two very large firms.

Wholesale Trade Employment

Wholesale trade employment and receipts increased more rapidly in Macon County than in Illinois between 1958 and 1963, reversing a declining trend during the 1954 to 1958 period. The average receipts per wholesale establishment, however, are considerably lower locally, though the difference has decreased since 1958. Also, the rate of increase in Macon County receipts for the 1958 to 1963 period was 50 percent; the rate of increase for Illinois and the East North Central Region was 24 percent, and for the nation, 25 percent. Except for the Champaign area, the Macon County growth rate was the highest among the metropolitan areas of the state.

Recent high growth rates are more indicative of the small size of the Macon County wholesale trade sector and the low base in 1958, rather than any major new growth trends in wholesaling locally. Macon County wholesale trade activity represents only 1.2 percent of Illinois establishments and less than one percent of Illinois receipts. The only Standard Metropolitan Statistical Area having a smaller ratio is Champaign, and its receipts nearly doubled in the period 1958 to 1963. Most wholesaling activity is concentrated in the distribution of foods and nonelectrical machinery products, though the distribution of some miscellaneous products such as petroleum also is important. This corresponds directly to the concentration of industries in the manufacturing sector.

Retail Trade Employment

Employment in the retail trade sector declined seven percent between 1958 and 1963 in Macon County, although retail employment in Illinois increased by seven percent. The growth in sales locally (14 percent) was lower than for Illinois (19 percent), though the rate of decrease in number of establishments was less. This resulted in higher ratios of employees per establishment and sales per establishment in Macon County than in Illinois; ratios of sales per employee were similarly affected. Compared with other metropolitan areas in Illinois, the Decatur area had a substantially lower growth rate in total sales; but the 1963 sales per capita of $1,517 was only slightly below average.

The highest concentration of retail sales in the Decatur area (90 percent) was in the central city in 1963. This indicates the exceptionally strong position of the central business district, contrary to nationwide trends. Recent expansion of Montgomery Ward and Sears, Roebuck and Company, and proposed expansion of J. C. Penney in the central business district will support this role of the central city.

The distribution of retail sales by type of product in the Decatur area shows a greater proportion in lumber, building materials and hardware, and automotive products and a lower proportion in general merchandise and apparel and accessory goods than the nationwide and regionwide average for cities the size of the Decatur area. Analysis of retail sales tax receipts indicates that the proportion of Macon County retail sales in the City of Decatur has declined slightly since 1956, although the 1964 proportion of 91 percent is higher than in any year since 1957. No other community in Macon County accounted for as much as one percent. The pattern in municipalities outside the City of Decatur has been a decline in proportion of county receipts except in Forsyth, Mount Zion, Macon, and Oreana. With the exception of Macon, these are the major towns closest to Decatur itself.

Professional Services

Professional services and finance, insurance, and real estate activities showed higher growth rates in employment than any other activities between 1950 and 1960, 57 percent and 44 percent respectively. Although these also were the most rapidly growing activities in Illinois in the same period, the rate of growth was even greater in Macon County. A large proportion of the professional services growth was in fields related to education and health. This trend should continue with the opening of new public schools and, possibly, a junior college, the expansion of Millikin University, and the growth of local hospitals, including the recently constructed State of Illinois (Adolph Meyer) Mental Health Clinic.

Selected services employment as reported by the Census of Business decreased by 3.4 percent between 1958 and 1963, although the number of establishments increased by six percent. In the same period, receipts rose only 13 percent, compared with 29 percent in the East North Central Region, and 37 percent in the United States. In other metropolitan areas of the state, expansion in sales ranged from 24 percent in Chicago to 38 percent in the Davenport-Rock Island-Moline area. The only exception was the Champaign area, with a growth rate of six percent for the 1958-1963 period.

As in the retail trade sector, selected services receipts are heavily concentrated in the central city. In 1963, 91 percent of receipts were in the City of Decatur, while other metropolitan areas in the state had between 66 percent and 79 percent in their central cities, with the exception of Rockford with 84 percent. Per capita receipts in 1963 were lower than for any other Illinois metropolitan area except Champaign. Compared to the regionwide and nationwide average for cities the size of Decatur, the concentration of receipts is somewhat higher in personal services and automobile services and is lower in business and repair services. The proportion of total receipts in miscellaneous business services also was lower in the Decatur area than in any other Illinois metropolitan area except Champaign and Davenport-Rock Island-Moline.

Forecast of Future Employment

Forecast year employment estimates were computed by a series of techniques. One method used was the application of participation and unemployment rates to population forecast data, to determine resident employment for the forecast year. Specific participation rates (the ratio of labor force to population) were estimated by sex and age-group, on the assumption that current participation rates would be altered by two general forces: a tendency for a larger proportion of young people to remain in school longer and a tendency for more women in all age groups to seek employment. By application of estimated participation rates to population forecast data, along with an assumed four percent unemployment rate, forecast year resident employment was estimated to be 68,300.

In order to estimate future total employment, the level of nonresident employment was assumed to be about eight percent of total employment in the forecast year. This assumed level is comparable to the current proportion of nonresident employment, which has ranged from six to eight percent during the past several years. Using this level of nonresident employment and the resident employment figure of 68,300, total employment for the forecast year (1985) was estimated to be 74,200.

An independent estimate of forecast year total employment was derived by the step-down-ratio method. This technique involved the computation of ratios relating employment in Macon County to that of larger areas, including Illinois, the East North Central Region, and the United States. Application of these ratios to National Planning Association forecasts of

1975 employment in the larger areas indicated a total employment figure of about 59,000 in Macon County in 1975. Assuming a similar annual rate of increase in the period 1975 to 1985 resulted in a forecasted total employment of 71,300 in Macon County in 1985.

Employment forecasts derived from the final population forecast (resident employment of 68,300 and total employment of 74,200) were used as control totals for estimating employment within general categories. Forecasted growth in resident employment by industrial sector is shown in Figure 2.

The distribution of resident employment in Macon County is not expected to change markedly by 1985. Highest growth rates are expected in the service, finance, insurance and real estate, government, and manufacturing sectors. A smaller proportion of persons will be employed in agriculture as the trend toward larger, more mechanized commercial farms continues. The proportion employed in manufacturing is expected to increase slightly. Macon County offers excellent advantages for various manufacturing industries, and thus the present trend is expected to continue.

Food processing and nonelectrical machinery may be expected to continue as the most important industries in the area, but greater diversification throughout the sector is probable. Although technological advance is expected to reduce the need for certain manufacturing skills, it also will increase the need for other personnel in most industries. Wholesale trade is not expected to increase significantly in the future, primarily due to Decatur's proximity to regional wholesaling centers in Chicago, St. Louis, and Indianapolis.

Retail trade also is expected to remain relatively stable as the trends toward fewer but larger stores and increasing sales per employee continue. This is primarily due to changing marketing procedures in the sale of such major retail types as food and general merchandise.

A major increase is expected in these sectors: finance, insurance, and real estate; services; and government. The rise in services is expected to be due primarily to an increase in the need for professional services, particularly related to health and education.

POPULATION

Since 1900, the population of the United States has increased more than two and one-half times, from 76,000,000 to more than 200,000,000. Most of this growth has been in metropolitan areas, with the urban population increasing from 40 to 70 percent of the nation's total population. The 1960 decennial census showed 80 percent of all Illinois residents to be living in urban areas. From the period 1940 to 1960, 98 percent of all Illinois growth occurred in Standard Metropolitan Statistical Areas.

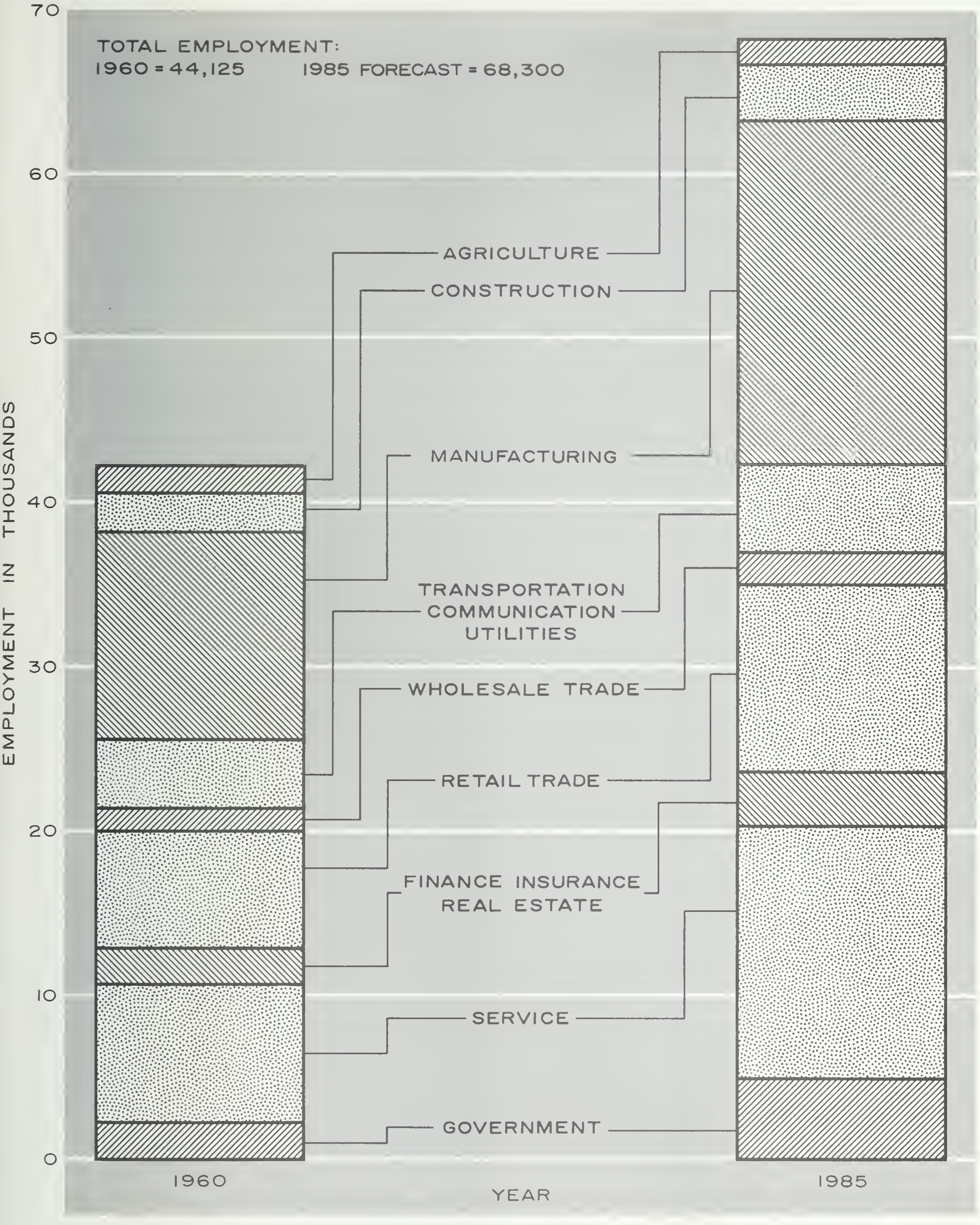


FIGURE 2:
MACON COUNTY RESIDENT EMPLOYMENT FORECAST

During the period 1950 to 1960, Macon County population increased by 19.6 percent, compared to increases of 18.5 percent for the United States and 15.7 percent for Illinois. In 1964, the county population was 124,300, of which 84,000 were in the City of Decatur. Decatur's population increased by 17.7 percent from 1950 to 1960. Much of the area's growth at this time occurred in residential subdivisions just outside of the city limits, so that the rate of urban growth was actually greater than that reported for the city. Since 1920, Decatur's population has represented a relatively high proportion of the total county population, primarily due to annexation by the city. The city is somewhat unique in this respect, considering the national trend toward suburban, rather than central city, growth.

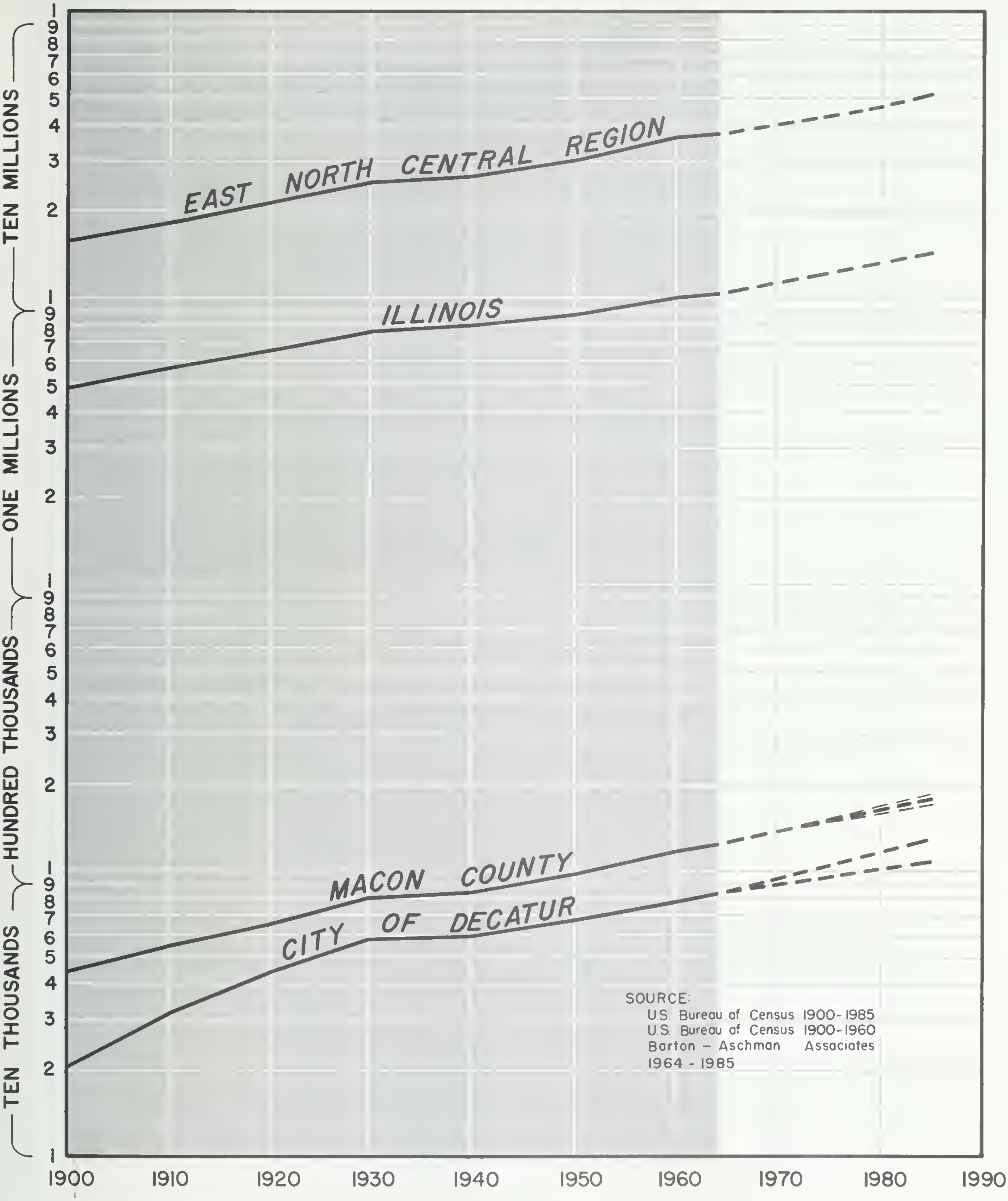
Two basic components determine population change--the natural component of births and deaths and the in-migration and out-migration component. During the 20 years from 1940 to 1960 birth and death rates in Macon County changed significantly, accounting for an increasing rate of natural population growth. For example, annual birth rates increased from 17.5 to 23.5 births per thousand population, to approximate the statewide rate of 23.7 in 1960. Traditionally, birth rates in Macon County have been higher than in the state as a whole, but have decreased from a high of 24.2 in 1950. On the other hand, death rates in Macon County have dropped faster (from 11.0 to 9.2 deaths per thousand population) than for the State of Illinois (from 11.2 to 10.2). Both birth and death rates are slightly higher in Decatur than in Macon County as a whole.

Between 1960 and 1964, Illinois experienced a dramatic shift in net migration, resulting in an annual net out-migration of 21,000 persons annually. Since Macon County has been dependent on net in-migration to help supply its growing labor force needs, it cannot help but be affected by statewide trends.

Net in-migration decreased from a total of 3,981 persons during the decade 1940-1950 to 3,438 persons during the decade 1950-1960. The greatest number of persons migrating into Macon County are job-seeking families (with children in the five to nine age-group) and single persons in the 25-34 age-group. For comparative purposes, net in-migration accounted for 17.7 percent of the 1950-1960 population increase in Macon County and 10.5 percent in Illinois. For the 1940-1950 period, the figures are 28.1 and 13.1, respectively.

Future Population Growth

Several standard forecasting techniques were employed to estimate future population growth in Macon County. Similar to the general method described for employment forecasts, a range of estimates was computed, and possible values reconciled with independent estimates of employment and land-use. Population forecasts prepared by in studies also were reviewed. A summary of the several forecast results and the final reconciled estimate of 180,000 are listed in Table 2. The past trend and projections are shown in Figure 3.



SOURCE:
U.S. Bureau of Census 1900-1985
U.S. Bureau of Census 1900-1960
Barton – Aschman Associates
1964 - 1985

FIGURE 3:
POPULATION GROWTH AND FORECAST

Table 2
MACON COUNTY TOTAL POPULATION FORECASTS

Method	1970	1975	1980	1985
Reconciled Trend(1)	138,500	149,300	160,100	171,700
Step-Down Illinois(2)	135,800	148,200	162,800	179,200
Step-Down East North Central Region(2)	136,900	147,100	159,100	177,300
Step-Down United States(2)	145,800	157,600	171,200	185,900
Natural Increase-Net Migration(3)	140,200	152,700	167,100	182,800
Modified Cohort-Survival(3)	136,600	147,200	155,200	174,500
1950-1960 Trend	141,400	155,300	169,200	185,700
Least Squares 1930-1960	126,400	133,000	139,200	144,100
Natural Increase-Net Migration(4)	143,400	157,900	174,600	-
Cohort-Survival(4)	131,200	157,500	175,900	-
Frank W. Gery(5)	-	-	-	185,000-191,400
Schellie Associates(6)	137,500	149,400	162,800	177,500
Most Reasonable Forecast Range(7)	-	-	-	176,000-185,000
Final Reconciled Forecast(7)	-	-	-	180,000

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(1) U.S. Bureau of Census, Census of Population, 1930-60.

(2) U.S. Bureau of Census, Current Population Reports, *Population Estimates,* Series P-25, No. 301.

(3) Ibid, Series P-25, No. 286.

(4) "Reports for City Planning 338," Professor J. R. Voss, University of Illinois, 1963.

(5) Frank W. Gery, *The Economic Future of Downtown Decatur,* 1962.

(6) Schellie Associates, *Macon County, Illinois Planning Studies,* 1964.

(7) Barton-Aschman Associates, Inc.

It is expected that 39.5 percent of the total population forecasted for Macon County in 1985 will represent members of the labor force. The 1985 labor force forecast of 71,100 is based on estimates of the participation of members of each labor force age-group. There are two general forces which may be expected to operate over the next 20 years: a tendency for a larger proportion of young people to remain in school longer and a tendency for more women in all age-groups to seek employment. In 1960, the participation rate of young persons was slightly lower than the national rate, and the female participation rate also was lower. It is primarily an increase in the female participation rate which is expected to increase participation in most age-groups, excepting the young and elderly.

Total resident employment in 1985 is estimated at 68,300, based on the assumption of a four percent unemployment rate. Nonresident employment is expected to represent a slightly greater proportion in 1985, for a total employment estimate of 74,200. This is consistent with past trends in the area.

Future Per Capita Income

Per capita income in Decatur and Macon County has consistently been less than that for the state as a whole. In 1960, family income in Macon County was $5,943, compared with $5,620 for the nation and $6,566 for the state. In 1960, 35.2 percent of Macon County families earned less than $5,000, 50.7 percent earned from $5,000 to $10,000, and 14.1 percent earned more than $10,000. In constant 1957-58 dollars, per capita income in the county was $2,040 in 1960 and $2,145 in 1964.

The per capita income forecast for 1984 is $3,110 for all of Macon County and $3,491 for the City of Decatur (in constant 1957-58 dollars). These figures assume a rate of increase identical to that forecast for the State of Illinois by the National Planning Association. The forecasts of this organization for larger geographic areas are considered the most reliable forecasts available, taking into consideration national as well as statewide trends. Median family income in 1985 is forecasted as $8,530 in constant 1957-58 dollars (or $9,270 in constant 1964 dollars) assuming a ratio of 2.74 of family income to per capita income as exhibited in the 1960-64 period.

Average annual disposable income per household in Macon County is expected to increase from $6,692 in 1960 to about $10,600 in 1985. County household expenditures averaged $5,814 in personal consumption and $3,450 for retail goods in 1960. By 1985, retail expenditures are expected to average $5,380, an increase of 56 percent (in 1960 constant dollars). The distribution of retail expenditures is not expected to change markedly during this period.

Automobile Ownership Per Capita

Automobile ownership in Macon County has, as in the rest of the country, been increasing at a faster rate than the population. The ratio of cars per capita increased from 0.30 in 1950 to 0.40 in 1964. Corresponding state and national ratios in 1964 were 0.36 and 0.37, respectively.

Several techniques were tested for the forecasting of automobile ownership. Ratios relating the number of automobiles in Macon County to the number in larger areas (Illinois, the East North Central Region, and the United States) were applied to forecasts for the larger areas, indicating about 90,000 automobiles in Macon County in 1985. Extrapolation of the past trend in cars per capita in the county resulted in an estimate of 97,200 automobiles in 1985.

note

The technique for forecasting automobile ownership selected for this study is predicated on the concept that the rate of automobiles per capita is approaching a saturation level. This concept is described in the article "Trends in Automobile Ownership and Indicators of Saturation" by Walter H. Botting, published in the Highway Research Board's Research Record No. 106 in February, 1966. The saturation level of 0.46 automobiles per capita, applied to forecasted population, resulted in an estimated 83,000 automobiles registered in Macon County in 1985. Since automobile ownership figures based on the extrapolation of past trends substantially exceeded the figure based on a saturation level of 0.46 automobiles per capita, the latter technique was selected for computation of the regional control total.

Truck ownership in Macon County increased by 41.5 percent between 1950 and 1960. In 1964, 8,889 trucks were registered in Macon County. This represents .0715 trucks per capita, a relatively high ratio compared with Illinois (.0429) and the United States (.0630). There is no clear explanation for such a high rate of registration in Macon County, since Decatur is not a major wholesale center. However, certain industries are known to register all vehicles in Macon County, although the majority are used elsewhere in the state. For example, the Illinois Power Company had 777 vehicles registered in Macon County in 1964, although 672 were used elsewhere in the state. The fact that Macon County is centrally located and has no local vehicle registration tax encourages this pattern.

The 1985 forecast of total trucks and buses is 15,000. This represents lower rates of increase in the ratios of trucks per capita and trucks per employee than were exhibited in the period 1950-1964. The forecasted ratio of trucks per capita in 1985 is .0833 compared with .0715 in 1964, and the ratio of trucks per employee is 0.202 in 1985 compared with 0.193 in 1964.

CURRENT POLICIES

Trends toward an increasingly urban society are intensifying demands on local agencies for the provision of public services. The typical urbanized region contains a multitude of governmental units (80 in Macon County) with varying specific functions, but with many common needs for regional facilities. Plans for all phases of regional development should reflect the programs of all affected agencies.

A two-day conference of local officials in Macon County was held in January, 1966. Issues influencing regional development were discussed and, when possible, statements of policy were formed by consensus. These included the following:

Economic Development and Housing

1. Decatur and Macon County will concentrate on the expansion of the industrial base as its primary source of economic growth.

2. The multipurpose use of Oakley Reservoir for state and regional recreation facilities will be explored as a means of diversifying the local economy.

3. The combined efforts of the community at-large will be utilized to promote growth of existing businesses and industries and attract new businesses and industries, but the city will not resort to tax concessions to entice such development.

4. A freeway connection to the nationwide interstate system is a primary goal to enhance transportation between Decatur and its world markets.

5. The central business district will remain the predominant business, cultural, and governmental center for the region; major outlying centers will be discouraged.

6. The city will continue its program of code enforcement and renewal aimed at improving the living environment of older residential areas and eliminating blighted conditions.

7. The city will encourage a wider variety of housing types including multi-family developments primarily in the vicinity of the central business district and mobile home parks at the periphery of the city.

Public Services

1. Macon County, the City of Decatur, the Decatur Park District, the Decatur School District No. 61, and the Decatur Sanitary District will continue to cooperate toward the objective of *controlled urban growth* in areas which can best be served by community facilities as opposed to unplanned dispersion of such growth.

2. To the extent possible, the neighborhood school system will be maintained and public parks and playgrounds will be developed jointly with all new school sites.

3. The excellent tradition of developing major public parks and recreation areas in the vicinity of Decatur will be continued in the future; all levels of government will be encouraged to conserve and utilize for public purpose the limited resource areas remaining in Macon County.

4. All new subdivisions within the environs of Decatur will be required to be served by public utilities either by connection with existing systems or by development of "package" systems; individual wells and septic tanks will be discouraged.

5. Natural drainage courses will be protected and encroachment upon these channels and floodways will be restricted.

6. Annexation to the City of Decatur and other incorporated areas will be encouraged, and the formation of additional municipalities will be discouraged.

Zoning and Subdivision

1. The City of Decatur and Macon County will utilize subdivision review procedures as a primary means of guiding development in conformance with the comprehensive plan.

2. Planned-unit developments will be encouraged, and small scattered subdivisions will be discouraged.

3. Zoning regulations are the primary device to achieve compatible land-use relationships; special criteria will be established in the vicinity of freeway interchanges.

4. The zoning district map will be related to market factors so as not to overzone for business and industrial districts.

LAND-USE

CHAPTER 2

The land-use phase of the transportation planning process involved an inventory and forecast of development by specific geographic location for all of Macon County. Data on inventoried and forecasted land-use were prepared in graphic form on a parcel basis, showing the type of development by 10 general categories. The quantification of development, measured by population, employment, and developed land area, was compiled according to traffic zones or districts.

Traffic zones were the basic geographic units employed in the traffic modeling phases of the transportation planning process. The Decatur urbanized area was subdivided into a total of 208 zones. The size of a traffic zone was dependent upon the density of development of the corresponding area and ranged from a few city blocks in the central business district to several square miles in rural or undeveloped areas. In some instances, data was summarized on a traffic district basis. Traffic districts were formed by the combination of traffic zones. A total of 91 districts were defined for the urbanized area.

The graphic and tabular forecasts of land-use by type of activity guided the forecasting of population and employment data for traffic zones. As discussed in the preceding chapter, projection of regional development resulted in control totals for forecast year population and employment data for the region as a whole. Forecast year estimates of population and employment for traffic zones were based on inventory findings for the year 1964, with the allocation of projected growth being guided by the relative accessibility, holding capacity, and density of development anticipated in areas of probable urban growth.

This chapter is divided into three sections. First, social and community values influencing the formulation of land-use and transportation plans are discussed. Second, the methods for projection of land-use and resulting growth patterns are described. Third, the distribution of forecast year population and employment data by traffic zone is described.

SOCIAL AND COMMUNITY VALUE FACTORS

In the process of planning and designing a modern transportation system, it is not sufficient to consider only the trip-generating characteristics of land-use. Public investment, years of tradition, and a way of life also are characteristics of urban development that must be considered. Those social and community values worthy of preservation or achievement should be accommodated and enhanced by the future transportation system. Among the factors considered were the following:

1. Existing and proposed schools and school districts.
2. Existing and proposed urban renewal areas.
3. Existing and proposed parks, open space, and recreational facilities.
4. Historical sites and buildings.
5. Other community facilities and considerations pertinent to the transportation study.

Existing governmental policies and comprehensive plans are the first indication of community values and should be used as the foundation for any new planning effort. Three such comprehensive plans were prepared for Macon County.

In addition, community values are represented in by-products of these plans such as existing laws and ordinances guiding new development in the area. Laws and ordinances of particular interest in the comprehensive transportation planning process are those related to official map regulations, zoning and subdivision ordinances, traffic and parking regulations, and to a lesser extent, building codes.

Governmental policies were established by means of the conference of local officials, discussed in the preceding chapter. The principal findings of this conference with respect to land-use planning were the expressed desires for encouraging growth of a single, compact urban area which would facilitate the provision of public services, and for discouraging the development of outlying regional centers that would compete with the Decatur central business district for retail trade and services.

Existing community facilities are shown in Figures 4 and 5. The region has been divided into two sections for mapping purposes. The central area, roughly encompassing land presently developed for urban use, is referred to as Study Area 1, and that part of the region outside of this central area is referred to as Study Area 2.

At the time of the inventory (1966), there were eight school districts and three park districts in Macon County. Small portions of seven other school districts headquartered in adjacent counties are located in Macon County as well. In the Decatur area, the Decatur School District and the Decatur Park District work closely with the city to practice the principle of the neighborhood unit. To the extent possible, administrators would like to locate coordinated school and

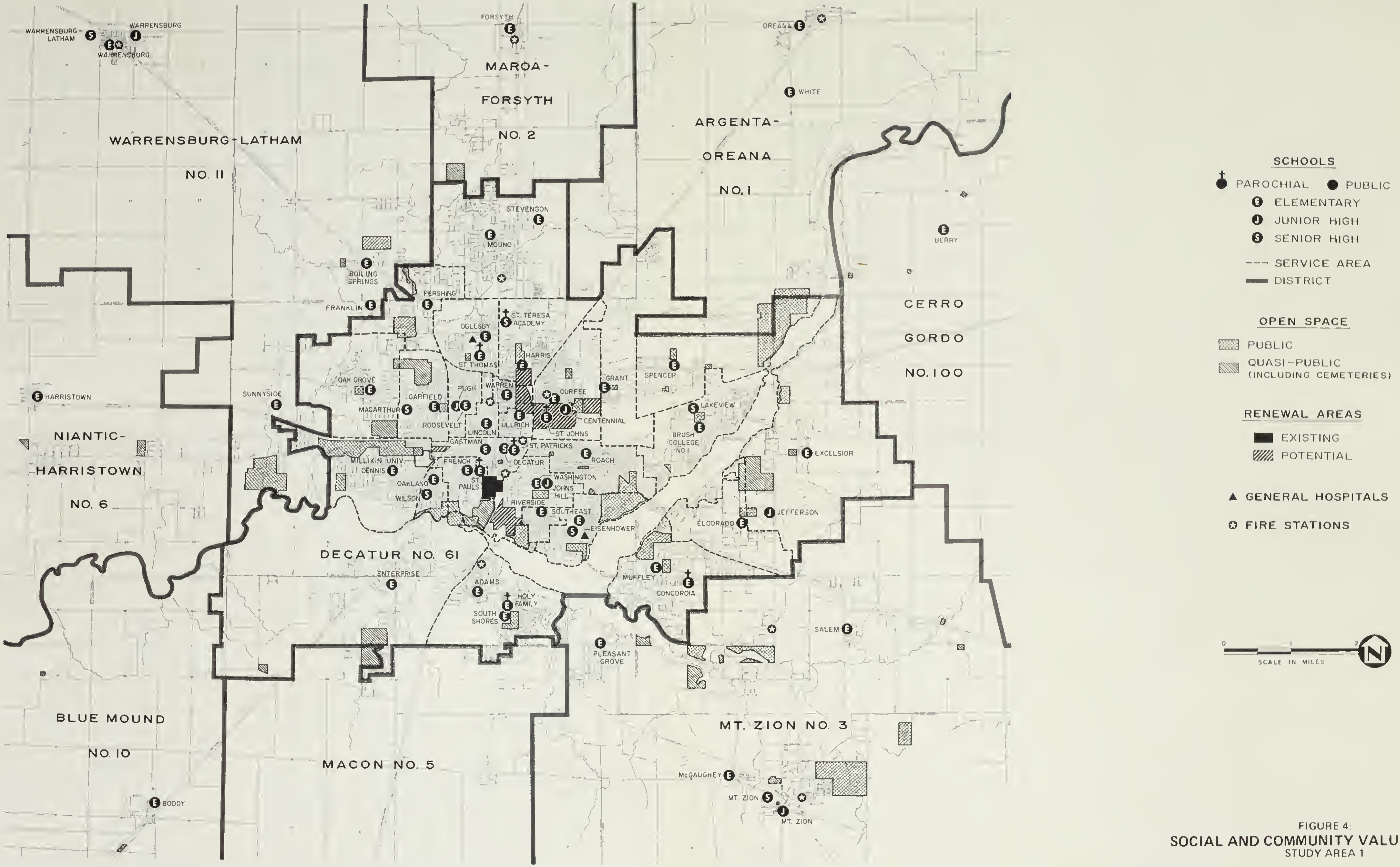


FIGURE 4:
SOCIAL AND COMMUNITY VALUE FACTORS
STUDY AREA 1

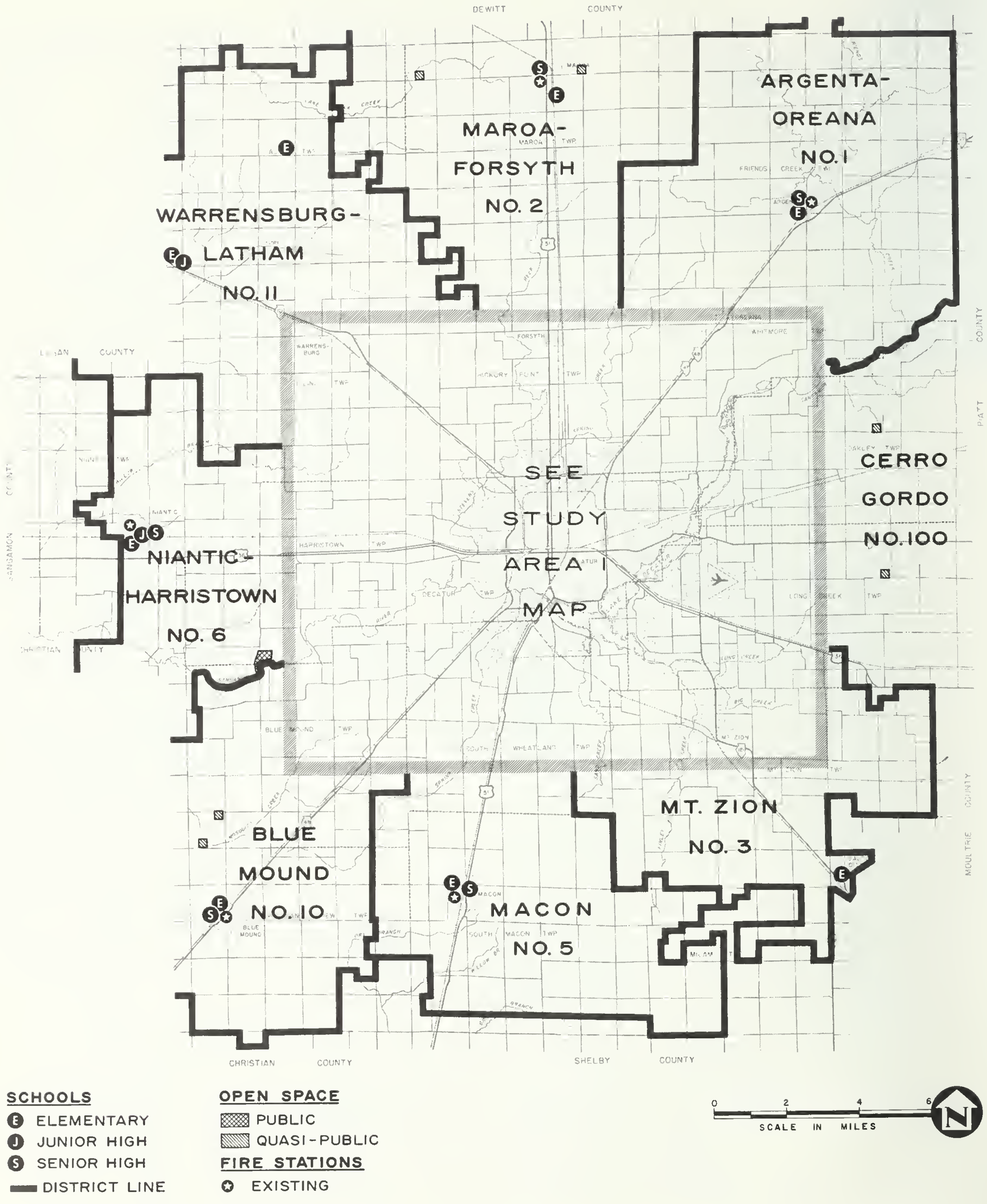


FIGURE 5:
SOCIAL AND COMMUNITY VALUE FACTORS
STUDY AREA 2

park sites within a safe and convenient walking distance for all children. Although it is extremely difficult to delineate neighborhoods as social units, it is possible to delineate school attendance districts and to substitute them for neighborhoods in many instances (see Figures 4 and 5). The Decatur School District included four high schools, five junior high schools, and 30 elementary schools at the time of the inventory. Several new elementary schools were planned.

Millikin University, a four-year liberal arts college, has recently expanded its campus by construction of a new cultural center. The university continues to enhance the overall cultural level of the community. In addition, a community junior college has been under active consideration for several years, but failed to receive approval in 1966 and 1967 referendums.

Decatur's park system is extensive and highly regarded. Although financing of major land acquisition is sometimes difficult, it would be desirable to maintain the present high ratio of open space to developed area. Land along the Sangamon River (including the proposed Oakley Reservoir) and Stevens Creek offers the best potential for local public recreation. It also is possible that a state park may be located in the vicinity of the Oakley Reservoir. The recently formed Macon County Conservation District will serve to ensure the preservation of natural features in the county and has already started acquisition of property for a nature center along the Sangamon River in the vicinity of Wyckles Road.

The preservation of historic sites and buildings also must be considered. In addition to churches and cemeteries, there are numerous other opportunities for preservation, including Lincoln Square, the Governor Oglesby Mansion at 421 West Williams Street, the Old State Road and Lincoln Heritage Trail, and the Lincoln Trail Homestead State Park.

Decatur is engaged in an extensive program of urban renewal. Construction for the Greenwood Urban Renewal Project was completed recently, and a second project in the Torrence Park area has received federal approval for survey and planning activities. A city-wide code enforcement and spot clearance program is currently in execution. The improvement of transportation facilities concurrent with major urban renewal projects affords the city an excellent opportunity for financial aid on capital improvements.

A close working relationship has been established between the City of Decatur and the Decatur Sanitary District for the provision of urban services. This working relationship favors compact urban growth and discourages scattered, low-density development.

Sewer facilities provided by the Decatur Sanitary District (as of 1966) are shown in Figure 6. Both the city and the sanitary district now require that new subdivisions be served by public sanitary treatment facilities. This means that a developer must tie into the existing sewerage system or must provide a temporary package treatment plant until a tie-in is possible. This policy encourages larger, planned subdivisions and probably reduces the long-range cost of services to the homeowner who would otherwise have to bear the initial cost of a septic tank and then convert to a public system.

The northern sector of the urban area is currently the easiest outlying area to serve with sewer facilities; recent extensions into this sector have opened land east of Highway 51 for development. Future interceptors also will be extended up the central branch of Stevens Creek and up through Scovill Golf Course to open the west side (see Figure 6). A new treatment plant may be required downstream on the Sangamon River.

PROJECTION OF LAND-USE

Past trends in the development of the Decatur area have generally been shaped by two features: the Sangamon River and the railroads. Decatur was founded in 1829, the original plat lying about one mile north of the Sangamon River. Limits of urban development at various stages of the city's history are depicted in Figure 7.

Railroad service was introduced to this area in 1854. Early industrial development occurred along the railroads north and east of the city center. With the exception of Borg-Warner just south of the Sangamon River and Pittsburgh Plate Glass near Mount Zion, major industrial growth has continued to be located in the northeast sector.

Early urban development was bounded by the lowlands of the Sangamon River to the south, or by Lake Decatur after its creation in 1923. In the 1940's, residential development jumped Lake Decatur and scattered subdivisions appeared to the south. The period of the 50's and 60's saw this trend continue with a filling-in and expansion of previous development areas. This has been encouraged by the simultaneous extension of public sewer and water service. The other major area of residential development occurred north of Pershing Road and, until recently, west of Highway 51. This also was dependent on the extension of public utilities. Conversely, areas to the northeast and west have not grown rapidly because of the lack of such utilities. During this period, Decatur's urban development was extended outward and now is almost contiguous with development in the vicinity of smaller outlying communities such as Forsyth, Long Creek, Mount Zion, and Harristown.

The growth of Decatur has depended on annexation of new areas originally developed outside the city. Conversely, the growth of Macon County as a whole has depended on public services provided by the City of Decatur and its related units of government. Although it is common for new growth to occur outside the corporate limits of the central city, Decatur has maintained a strong policy favoring annexation and today includes a much higher percentage of all urban development than do most central cities.

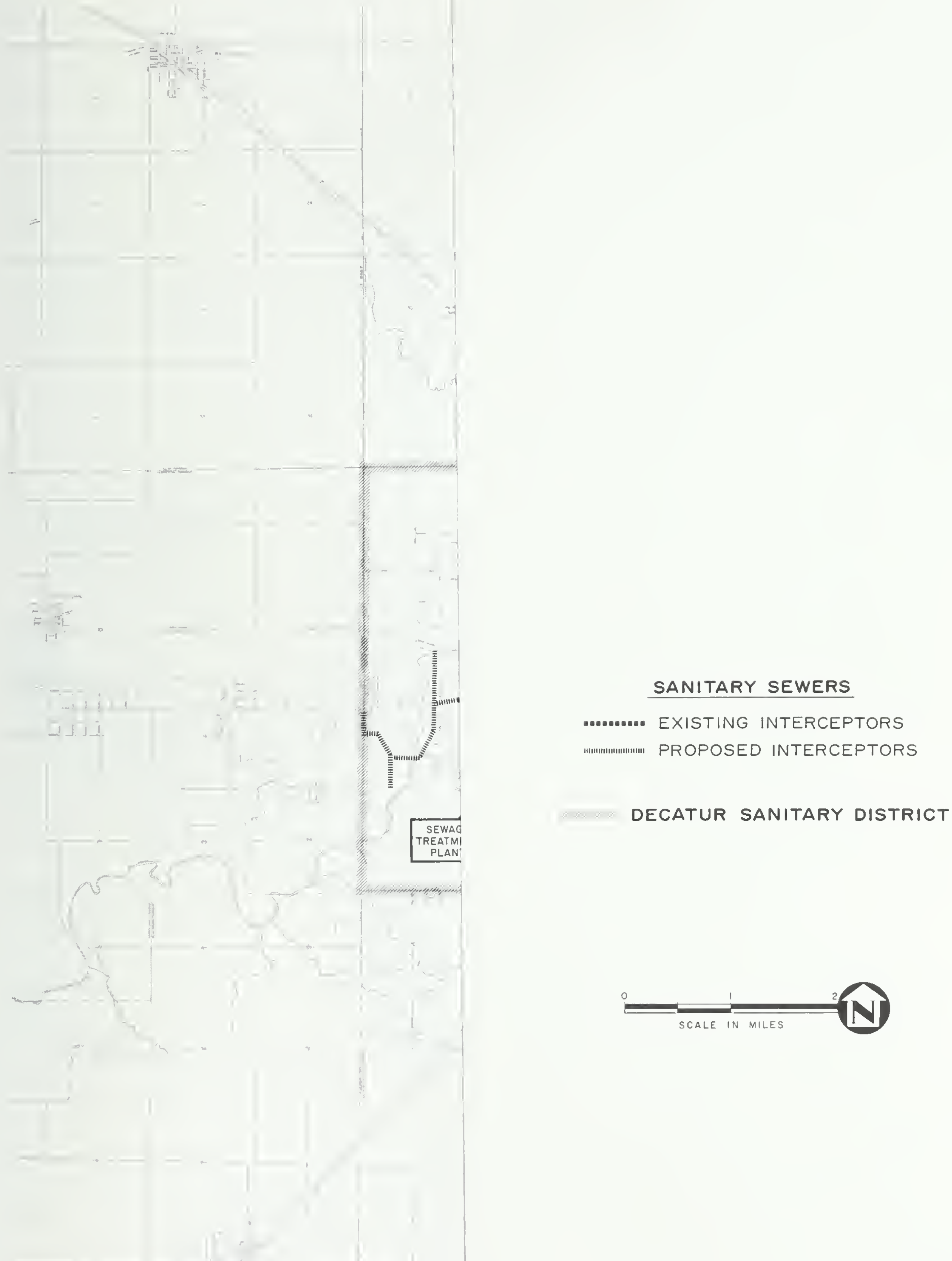


FIGURE 6:
SANITARY SEWERS

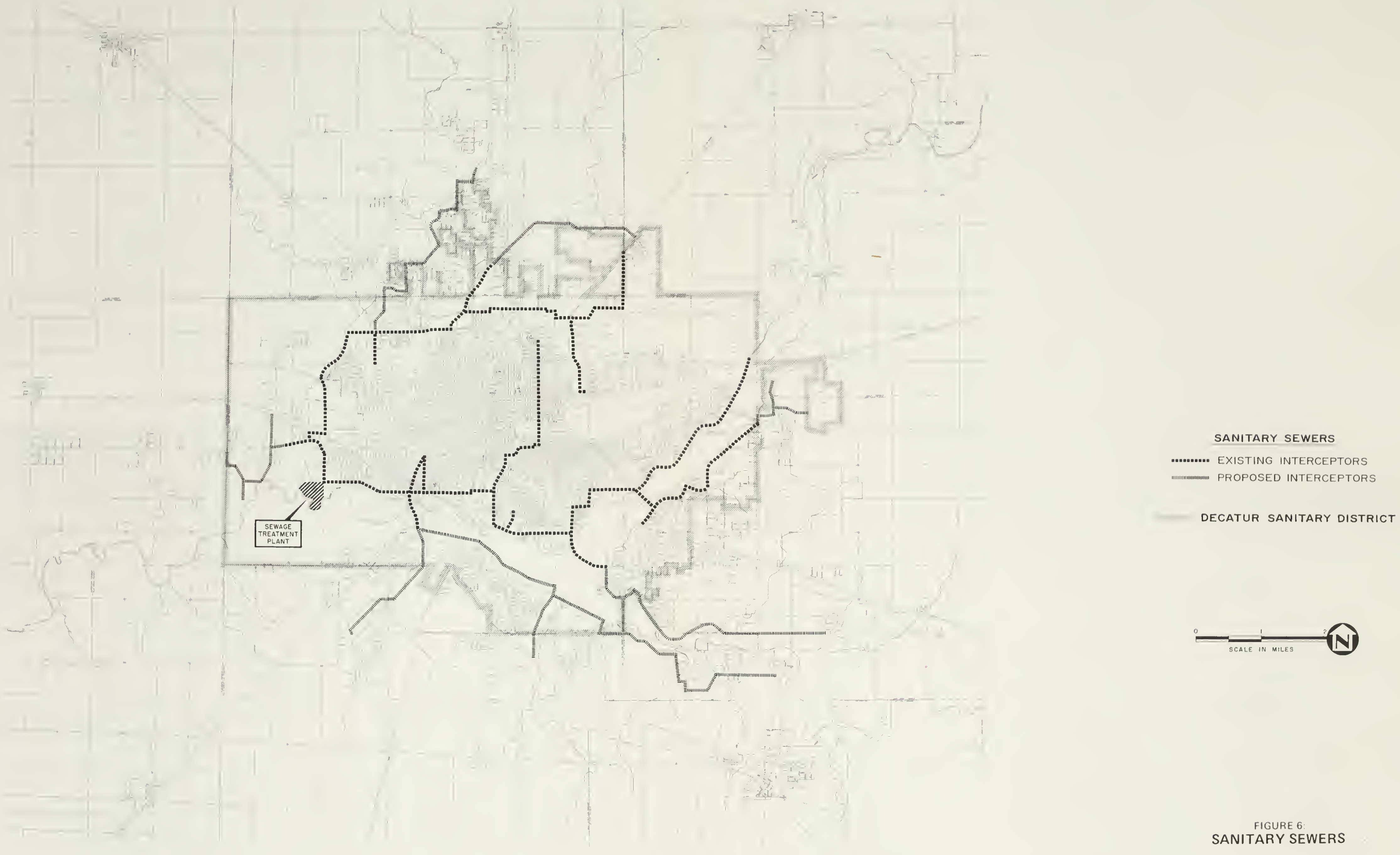


FIGURE 6:
SANITARY SEWERS

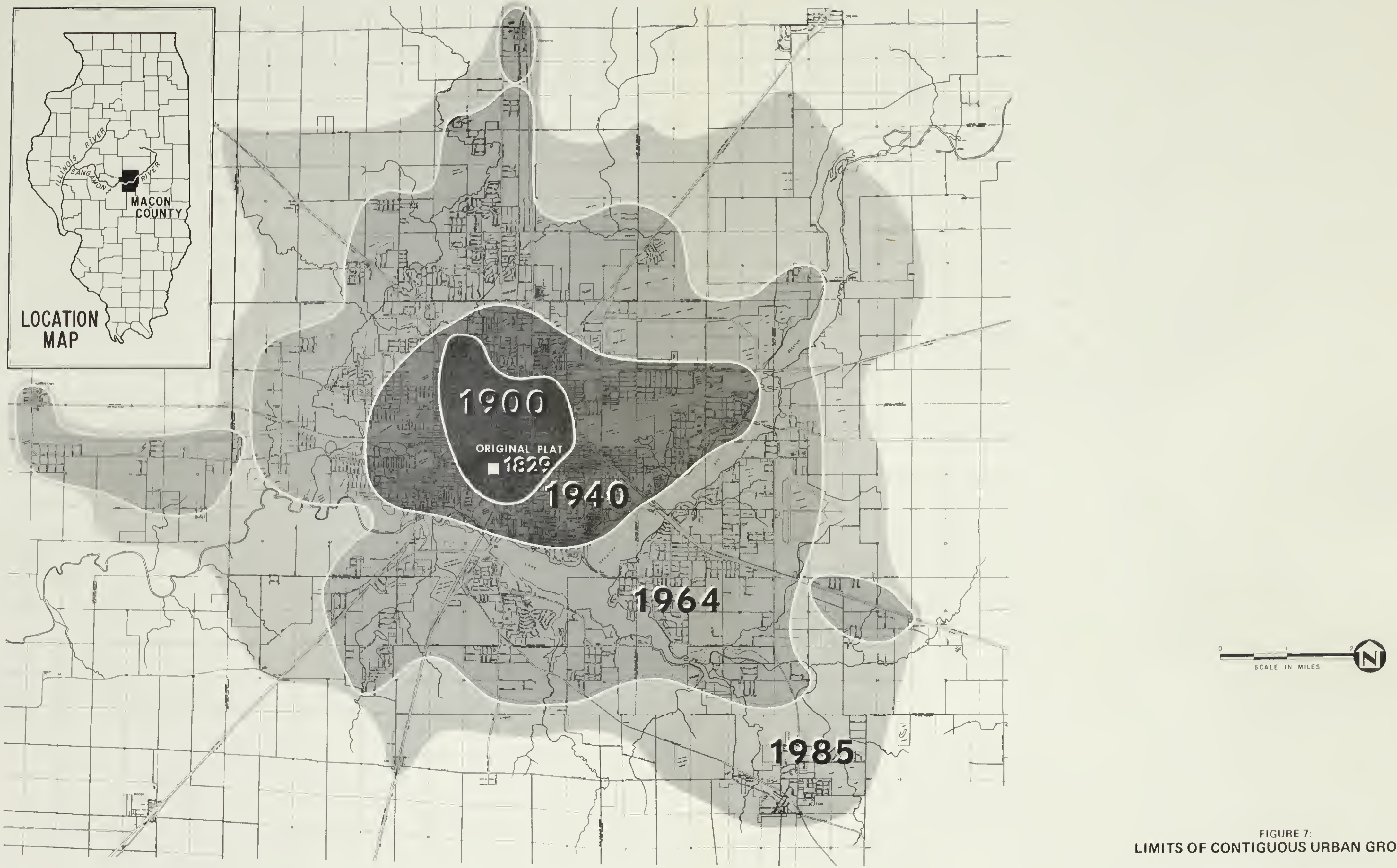


FIGURE 7:
LIMITS OF CONTIGUOUS URBAN GROWTH

This is generally advantageous to the performance of sound local government.

Following its initial years of growth, Decatur pursued a very conservative course relative to annexation. For example, the city did not increase its size measurably from 1940 to 1950, during which time it occupied 9.5 square miles. Decatur more than doubled its size by 1960 and covered 29.4 square miles (including Lake Decatur) or 5.1 percent of Macon County as of April 30, 1966. Recent annexations (since 1960) include the major industrial complex covering Firestone, General Electric, Caterpillar, Neisler, Grigoleit, Parke, and Ralston Purina companies, and large residential areas on the north, northwest, east, and south. At the same time, Decatur's overall population density has decreased from 7,126 persons per square mile in 1950 to 2,960 persons per square mile in 1966.

As a first step toward the forecasting of future urban growth, a detailed survey of existing development was performed. Utilizing aerial photographs, previous land-use inventories, and field survey techniques, the amount of land devoted to each of 10 land-use categories was inventoried, quantified, and tabulated. In addition, the number of housing units was inventoried, classified by type (single- and two-family and multiple-family), and tabulated. Procedures used for this land-use inventory are documented in Interim Report 3. The land-use and housing data were summarized on color-coded land-use maps of the study area, and by tabulations of the gross use of land by category for traffic zones and districts. Land-use consumption rates (acres per 1,000 persons) also were prepared for each land-use category.

The forecast of 1985 land-use was based upon several factors. As mentioned in the preceding chapter, independently derived economic, population, and land-use forecasts were reconciled for computation of precise regional control totals. Current land-use patterns and recent trends in urban growth formed a major forecast input. Social and community value factors discussed in the first section of this chapter helped to define past trends, as well as facilitate the evaluation of alternate growth concepts in light of regional policies. A principal technical input was the availability of land for future development.

The theoretical upper limit of land available for future urban development is the difference between the total land area and the amount of land currently in urban uses. Practically speaking, however, the limitation on future urban development is the maximum amount of unused land available which also is physically suitable for urban development.

Physical suitability may be determined by examination of topography, soil type and quality, water supply availability, drainage characteristics, mineral characteristics, and floodplain characteristics. The actual amount of land both suitable and available for specific land-uses can be further determined by quantifying the amount of unused land in each mapped zoning district suitable for the uses permitted in that district.

In general, most land in Macon County is suitable for urban development. There is very little restriction on urban growth based on physical features alone. Existing growth trends and zoning and utilities factors, however, do restrict the availability of land for specific uses and the economic feasibility of development.

Study of unused land indicated the following general patterns of available, suitable land. Land suitable for manufacturing, transportation, communications, utilities, and wholesale use is located primarily northeast and, to a lesser extent, to the east, southwest, and southeast. Land suitable for residential use is located primarily west, southwest, south, and southeast, and to a lesser extent, to the north and east.

A summary of land-use projections on an area-wide basis is listed in Table 3. Developed land occupied about 11 percent of the county in 1964 and is expected to occupy about 16 percent in 1985. Developed land is anticipated to increase by approximately the same proportion as population, with increases of 42.8 percent and 44.8 percent, respectively.

Land-use forecast maps for Study Areas 1 and 2 (see pocket on inside back cover) show projected land-uses for 1985. Not all of the areas coded for development are expected to be fully developed in the forecast year. Locational choice prevails, and many areas may be only partially developed by 1985. Partial development was taken into consideration in the zonal distribution of land-use acreages.

The land-use forecast prepared for this study does not constitute an officially adopted land-use plan. It is a composite of existing

Table 3
DEVELOPED LAND AREA BY CATEGORY

Land-use	1964 Acres	1985 Acres	Change In Acres	Percent Change
Residential	15,064	21,857	+ 6,793	+ 45.1
Manufacturing	1,428	2,111	+ 683	+ 47.8
Transportation R.O.W.	20,781	22,639	+ 1,858	+ 8.9
Transportation, Communications, and Utilities	890	1,093	+ 203	+ 22.8
Wholesale Trade and Storage	420	499	+ 79	+ 18.8
Retail Trade	414	599	+ 185	+ 44.7
Services	385	790	+ 405	+105.2
Educational, Religious, and Cultural	608	810	+ 202	+ 33.2
Parks, Playgrounds, and Open Space	2,275	9,955	+ 7,860	+337.6
Total:	42,265	60,353	+18,088	+ 42.8

formal or informal plans of the various governmental agencies, supplemented by planning judgment in cases where these plans were incomplete or obsolete. Forecasts were largely guided by two documents prepared in other studies: *Comprehensive Plan for Major Streets, Schools and Parks, Population, Parking, and Land-Use,* prepared by the City of Decatur, Department of Planning and Development, 1961; and *Macon County, Illinois, Planning Elements,* prepared by Schellie Associates, February, 1965. The following paragraphs summarize underlying assumptions for the land-use forecast.

It is expected that the basic symmetrical pattern of the Decatur area will persist and that new development will be predominantly contiguous to existing development. General development trends will favor the north, west, and south, where the urban fringe will encompass the communities of Forsyth, Bearsdale, Harristown, Elwin, Mt. Zion, and Long Creek, which are now separate urban places. Growth will continue to be retarded on the east due to the Oakley Reservoir, large industrial tracts, and the Decatur Municipal Airport.

Although a considerable amount of new residential growth may be anticipated on the south due to new sanitary sewer extensions and a pleasant environment, major residential growth was forecasted north and west of the present urban area. Freeway alignments most probable at the time of forecast preparation prompted this allocation of residential growth. The average residential density in Study Area 1 will be 3.85 housing units per acre compared with 4.50 housing units per acre in 1964. The highest densities will occur principally near the central business district where new medium-rise apartments are anticipated. However, higher than average densities also will occur in outlying areas subject to new garden apartment development, similar to that on Woodford Street near Mound Road. This is a nationwide trend, becoming apparent in Decatur since 1964. The proportion of multiple-family units will remain approximately 10 percent of the total in 1985. It also is expected that mobile home parks will expand on the periphery of the area.

Residential growth in Study Area 2 will occur primarily in the outlying subdivisions of Decatur, with small outlying communities growing modestly and the number of farmsteads decreasing. The average residential density in this area will be 1.03 housing units per acre, compared with 0.84 housing units per acre in 1964. The number of acres in residential use and the number of housing units in Study Area 2 may exceed this forecast if special utility districts are actually developed, as are now being discussed, increasing the availability of desirable building sites.

Exceptions to the expansion of manufacturing development in the northeast and east sectors of Study Area 1 are expansion near the Borg-Warner site south of the Sangamon River, expansion near the Pittsburgh Plate Glass site east of Mt. Zion, new development in the vicinity of Bearsdale and Argenta, and new development on the Wabash Industrial Tract east of Decatur.

The central business district will remain the dominant retail and service area; expansion in this area will be vertical rather than horizontal. The strength of the central business district should discourage construction of major outlying shopping centers of a regional character. Major outlying developments of a specialized character will occur, however, including Decatur Memorial and St. Mary's Hospitals, the new Albert Meyer Mental Health Clinic, and the proposed insurance company headquarters (both on Mound Road), and the Illinois Power Company. Strip commercial also will expand along Pershing Road, and to a lesser extent, along Oakland Avenue. In Study Area 2, major new developments will occur in the vicinity of probable freeway interchanges, the most important of which will be in the vicinity of Oakley Reservoir midway between Decatur and Oreana.

ZONAL SOCIOECONOMIC DATA

Population, employment, and land-use data were forecasted by traffic zone for subsequent use in traffic modeling phases of the transportation planning process. These data form the link between projected regional development and corresponding travel patterns. As discussed in following chapters of this report, socioeconomic data may be used to estimate the amount of travel generated within each traffic zone.

The projections of land-use described in the preceding section define the probable future use of specific geographic areas, but do not quantify future activity in sufficient detail for traffic modeling. Also, the graphic summary of land-use does not, as discussed in the preceding section, indicate the degree to which these areas will be developed. Zonal data on land-use, recorded as land area in acres by category, have been reconciled with forecasts of population and employment data, and are indicative of the anticipated degree of development by traffic zone.

Population data forecasted by traffic zone included estimates of housing units, population, average family income, and vehicle ownership. Projected changes in population by traffic district are shown in Figures 8 and 9.

Housing units were the first of the population data forecasted by zone and provided a basis for estimating most of the other population data. Control totals for the number of housing units forecast in 1985 had been compiled in the study of regional development factors. Allocation of the growth in housing units was primarily guided by existing development plans, zoning requirements, location of suitable and available land, and density factors appropriate in view of existing development or local policies. Multiple- and single-family units were separately allocated.

Population and auto ownership were estimated by the application of rates per housing unit defined for each zone. Rates were generally based on corresponding data recorded in socioeconomic inventories. Spe-

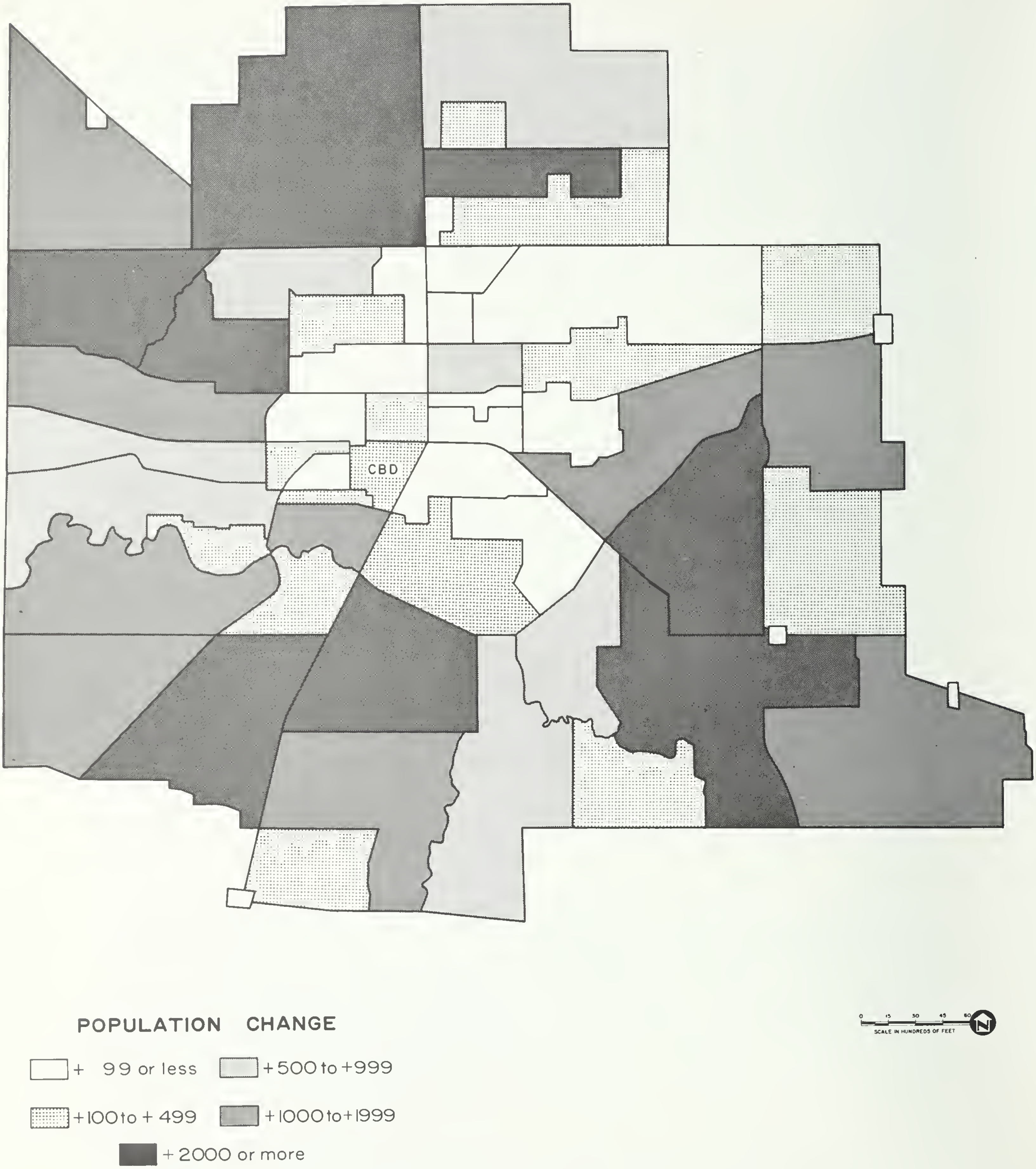


FIGURE 8:
POPULATION CHANGE
STUDY AREA 1

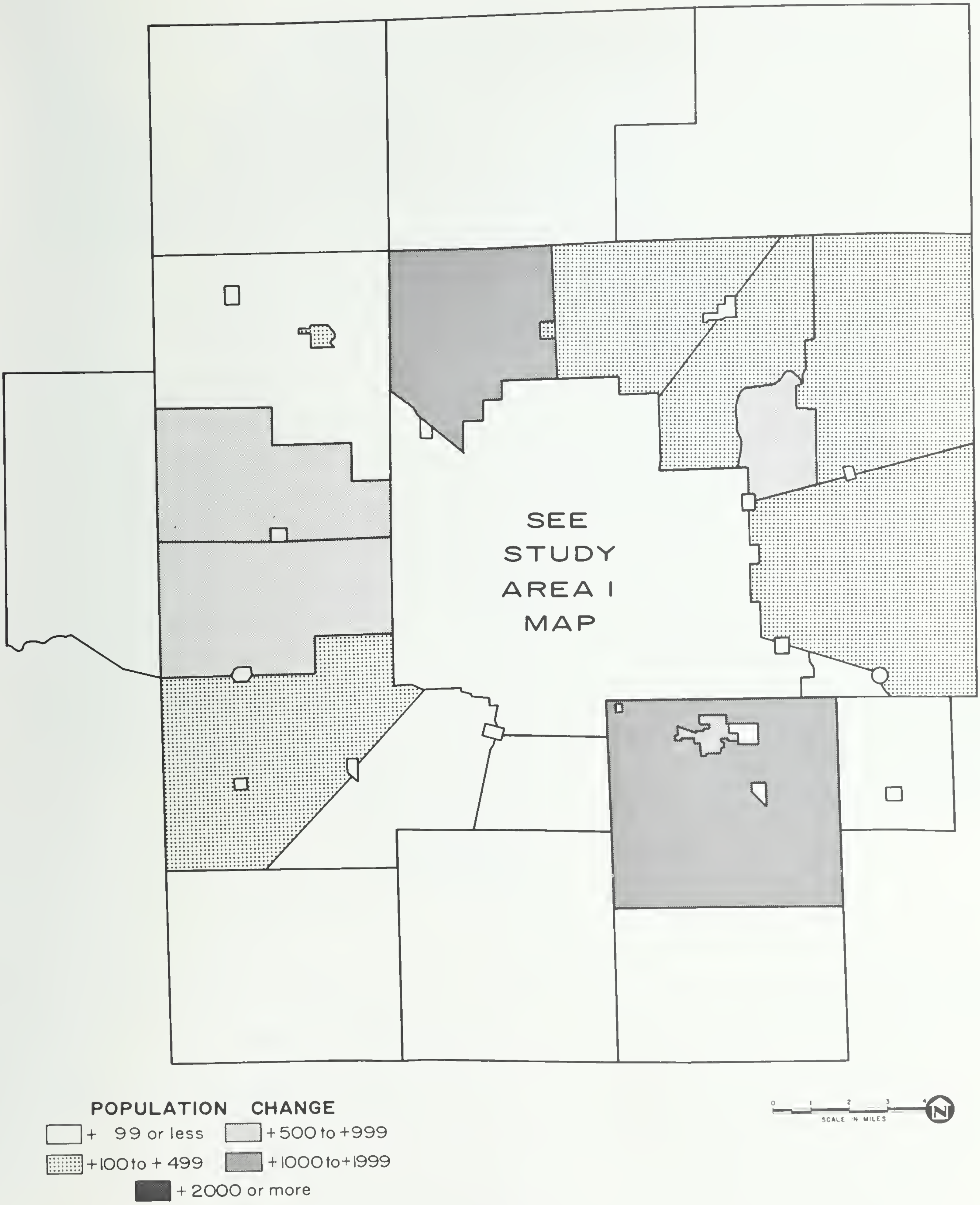


FIGURE 9:
POPULATION CHANGE
STUDY AREA 2

cific zone rates were modified as appropriate for the forecast year, in view of anticipated changes in development.

The forecasting of average family income was accomplished by dividing zones into several groups based on their relative position in the inventoried range of average family incomes by zone. Forecast year income was generally based on the assumption that the zone would maintain its relative position in the range. In some instances, anticipated development warranted adjustment of this relative position for specific zones.

Employment data forecasted by traffic zone included estimates of employment by several land-use group categories, equivalent to specific industrial classifications. Projected changes in employment by traffic district are shown in Figures 10 and 11.

The technique for allocating growth in employment,by category, was similar to that described previously for the allocation of housing units. The study of regional development factors provided control totals, and planned development, zoning requirements, the location of suitable and available land, and densities for specific zones and employment categories guided allocation by traffic zone.

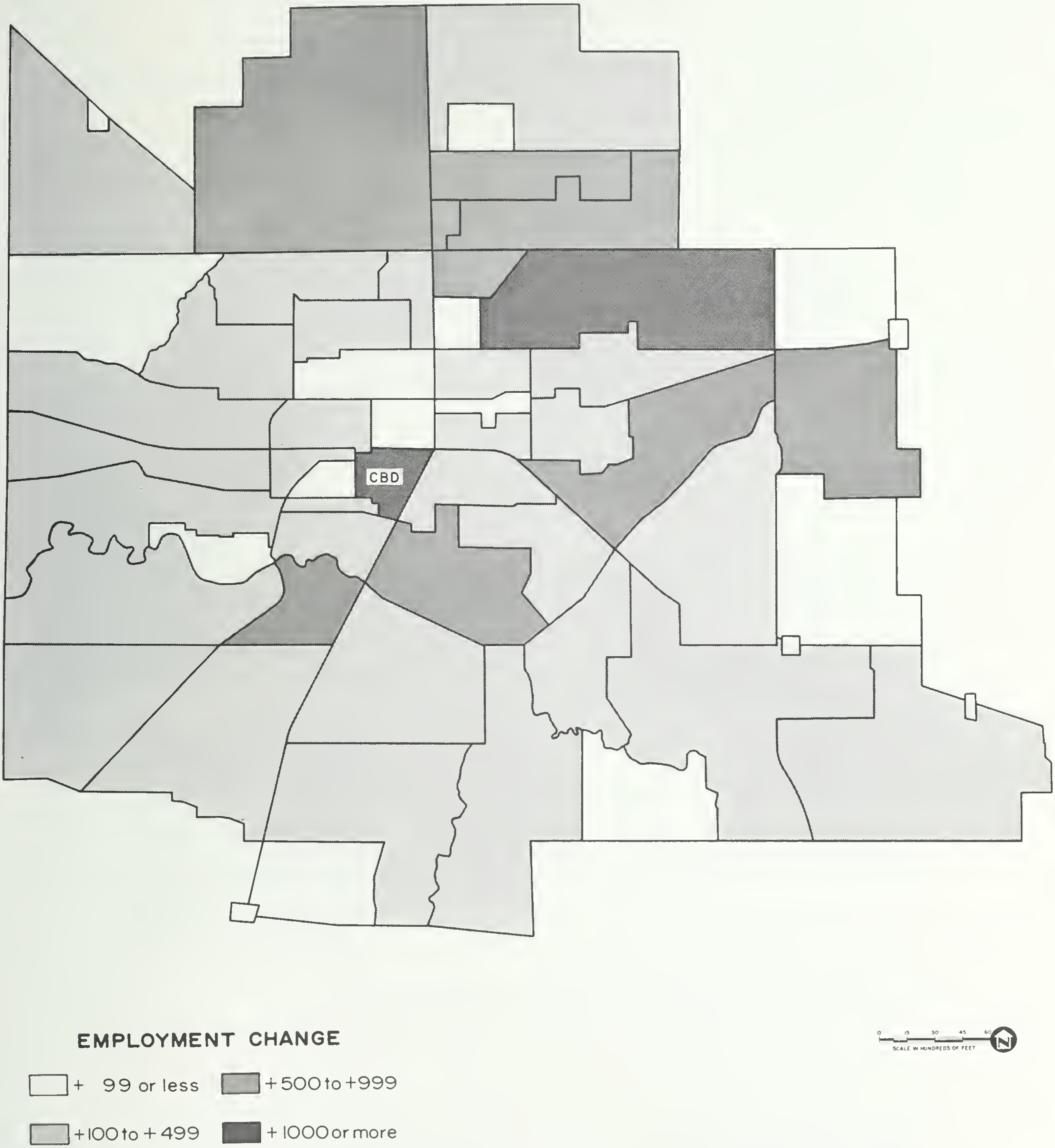


FIGURE 10:
EMPLOYMENT CHANGE
STUDY AREA 1

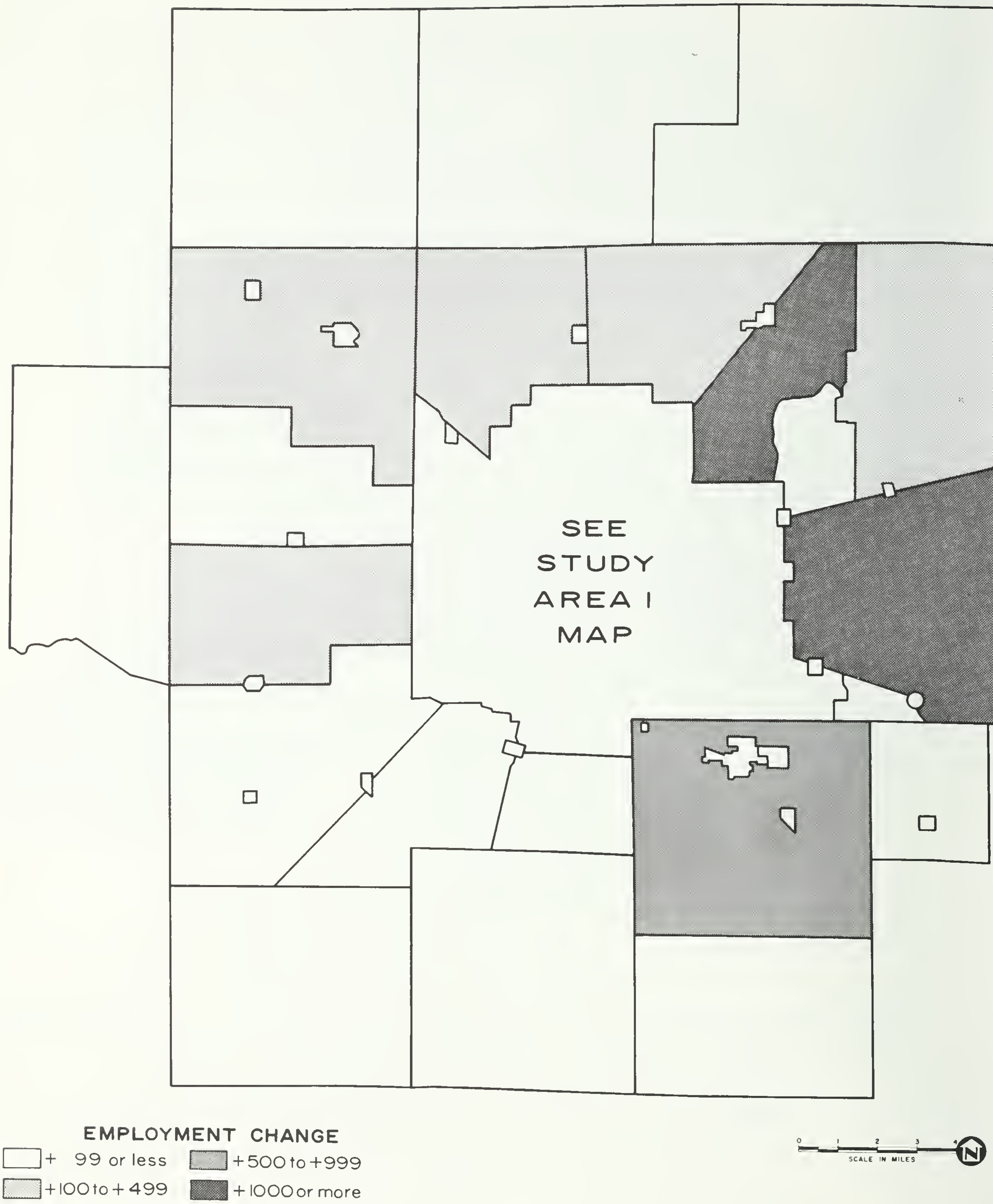


FIGURE 11:
EMPLOYMENT CHANGE
STUDY AREA 2

TRAVEL PATTERNS

CHAPTER 3

Distinctive characteristics of the movement of people and goods in a region are known as travel patterns. These characteristics include traffic volumes and direction of movement. Past experience in large urbanized areas has indicated that travel is highly repetitive from day-to-day when analyzed for a region as a whole. This enables transportation planners to form general conclusions about the nature of the travel that occurs throughout a region, based on a study of characteristics as these are indicated by a representative sample of the trips made in the region.

The representative sample of trips in the Decatur urbanized area was obtained by surveys conducted in the autumn of 1964. The data collected in these surveys were used to analyze travel patterns in the region for a typical weekday in 1964. The travel characteristics identified by the analysis are described in the first section of this chapter.

Travel patterns are dependent upon regional development patterns, to a large extent. That this would be true in some instances is obvious; one would naturally expect the greatest amount of trips to be generated by areas of the greatest activity, such as commercial centers. The interdependence of travel and development patterns may be precisely defined for all areas of a region, however, by means of standard analysis techniques. Traffic modeling, the process of defining mathematical relationships between travel data and socioeconomic data, is described in the second section of this chapter.

The forecasting of travel patterns is accomplished by applying the traffic models to socioeconomic data projected for the forecast year. A summary of travel forecasts for the Decatur urbanized area is presented in the third section of this chapter.

CHARACTERISTICS OF TRAVEL

Travel habits of residents of the Decatur urbanized area were inventoried by means of a home interview survey. A sample of approximately two percent of all households in the region was selected for inventory in this survey. A total of 612 households were visited during the autumn of 1964.

Residents of a sample household were questioned regarding the trips they made on a predetermined day. All family members five years or older participated in this survey. Along with a record of the origin and destination of each trip, interviewees were asked to state the purpose for making each trip, the mode by which they traveled, and the time at which the trip was made. Trips made by walking, bicycle, or motorcycle were not recorded, but all other common modes of transport were represented in the sample.

Truck and taxi travel characteristics were inventoried in a similar manner. Using vehicle registration records, a four percent sample of trucks garaged in the study area was selected for inventory. Operators of the vehicles selected for inventory were questioned regarding all trips made with the vehicle on a predetermined day. One-third of the taxis registered in the study area were included in a similar inventory. The data collected on truck and taxi trips were limited to origin, destination, and the time of the trip.

Motorists entering or leaving the area on principal routes were interviewed at external survey stations. Data obtained from these motorists were similar to that obtained in the home interview survey, with one exception. In the home interview survey, trip purpose at both the origin and the destination end had been recorded. In the external survey, only a single purpose for the trip was recorded, and "home" was not included as a possible trip purpose.

Data obtained from the two percent sample of trip-makers interviewed in the travel surveys were used to estimate the total travel in the region on a typical weekday by the application of expansion factors. Briefly stated, each trip record was assigned a weighting factor based on the number of trip-makers represented by a single interviewee. Truck, taxi, and external survey data were expanded in a routine manner.

Expansion of the home interview sample required special handling. Due to the relatively small number of interviews collected in comparison to the number of traffic zones or districts into which the area had been divided, it was necessary to expand the sample on a sector basis. The 208 traffic zones were aggregated to form 13 sectors. Aggregation to these relatively large analysis areas was necessary to achieve a reasonable balance of expansion factors by analysis area.

Checks for Accuracy and Completeness

Following the expansion of travel data, checks on the completeness and accuracy of surveys were made. The first of these checks involved tabulation of household statistics based on the home interview survey findings. Counts of dwelling units, population, and car ownership were compared with similar statistics from independent sources. Comparisons were made both for the study area as a whole, and for each of 13 subdivisions (sectors) of the area. A summary of these comparisons is shown in Table 4.

Table 4
COMPARISON OF HOUSEHOLD STATISTICS

Statistic	Home Interview	Socioeconomic Inventory
Population	110,100	116,321
Dwelling Units	34,773	38,258
Population per Dwelling Unit	3.2	3.0
Automobiles	43,334	45,737
Population per Automobile	2.5	2.5
Automobiles per Dwelling Unit	1.2	1.2

It may be noted that the home interview survey figures for population, dwelling units, and automobiles are all less than corresponding statistics from the socioeconomic inventory. This is attributable to the fact that in the home interview survey, households in which the family members were not within the study area on the day designated for their trip reporting are not included in the statistics for the home interview survey. Making allowances for this, comparisons of household statistics on an area-wide and sector basis indicated that sample households were representative of typical households in the study area.

The second type of check was the comparison of screenline crossings. During the course of the travel surveys, counts of vehicular traffic were made at numerous points where streets and highways crossed a hypothetical screenline bisecting the study area. These counts were compiled by vehicle type and by hourly increments of time. Corresponding tabulations of the travel survey data were made by summing trip records for which the origin and destination was on opposite sides of the screenline. Comparison of screenline crossings recorded by the two sources was used to evaluate the completeness of travel survey data.

Analysis of the screenline crossing comparisons indicated that further factoring of the travel data would be necessary. Screenline crossings estimated from travel survey data represented only 68 percent of the crossings recorded by traffic ground counts. Comparisons by vehicle type indicated that both the home interview and truck survey data required factoring.

Computation of adjustment factors for the home interview survey was based on tabulations of screenline crossings by trip purpose. It was found that the data more accurately represented peak periods than non-peak periods of travel. A majority of trips made during the peak hour are for the purpose of work, the type of travel commonly best remembered by interviewees. In this study, trips for the purpose of serving passengers also were a significant portion of peak-hour travel. After the evaluation of several possible adjustment factoring techniques, factors of

1.10 for "work" and "serve passenger" trips and 2.00 for trips of all other purposes were selected.

An adjustment factor also was applied to the truck survey data. A single factor of 1.42 was computed, since trip purpose had not been identified for truck travel. No screenline adjustment factors were applied to data from the taxi survey or external survey, since the sample size for each of these surveys was considerably larger than that for either the home interview survey or truck survey. Consequently, taxi and external survey data were considered more reliable.

Tabulation of Survey Data

Following the application of expansion factors and screenline adjustment factors, tabulations of survey data were representative of vehicular travel in the study area on a typical weekday in 1964. Several standard summary tabulations of these data were prepared for quantification of travel characteristics. An abbreviated listing of statistics on mode and purpose derived from home interview survey data is contained in Table 5.

The trips made by residents of the Decatur area were strongly oriented to the automobile, with nearly 95 percent of the trips recorded being made as an auto driver or auto passenger. It was noted that the number of transit trips recorded in the home interview survey was about twice the average daily number reported by transit officials. Even this inflated number of transit patrons, caused by the combination of a low percentage of transit trips and a small sample survey, indicated that transit travel is a very small part of typical daily travel in the study area. The number of truck and taxi passengers, included with the tabulation of trips for auto passengers, was negligible.

Nearly 40 percent of all trips reported were for the purpose of reaching home, which is similar to the findings of most origin-destination surveys. The next most frequently reported purpose was shopping, followed by

Table 5
TRAVEL MODE AND TRIP PURPOSE REPORTED IN HOME INTERVIEW SURVEY

	Mode					
Purpose	Auto or Taxi Driver	Auto, Truck, or Taxi Passenger	Transit	School Bus	Total	Percent
Home	113,400	51,400	4,100	8,400	177,200	39.2%
Work	39,500	6,200	900	0	46,700	10.3
Personal Business	28,800	8,900	400	100	38,300	8.5
Medical-Dental	2,800	1,300	100	0	4,200	0.9
School	3,900	14,000	2,300	9,500	29,700	6.6
Social-Recreational	24,100	19,300	0	100	43,500	9.6
Change Mode	0	300	0	0	300	0.1
Eat	11,400	4,200	0	0	15,700	3.5
Shopping	49,000	19,300	300	0	68,600	15.2
Serve Passenger	25,500	2,300		0	27,800	6.1
Total:	298,500	127,200	8,200	18,100	452,000	100.0%
Percent:	66.1%	28.1%	1.8%	4.0%	100.0%	

work, and social-recreational activity. Work trips and "serve passenger" trips normally would be expected to represent a greater proportion of total daily travel. The relatively small number of trips reported in these categories was partially attributable to the screenline adjustment factoring process.

The number of social-recreational trips reported also represented a smaller proportion of total daily travel than would ordinarily be expected.

Further analysis of Table 5 reveals several differences in the relative importance of trip purposes for the various travel modes. The purpose of work was significantly higher for auto drivers than for other travel modes, and nearly all "serve passenger" trips were reported within the auto driver mode. More social-recreational and school trips were reported for the "auto passenger" mode than for any other mode. The proportion of transit travel reported for the purpose of school was substantially higher than the porportion estimated by an independent survey, which suggests that a number of school bus passenger trips may have been erroneously reported as transit mode trips.

The classification of external survey trip records by trip purpose and vehicle type is listed in Table 6. About 80 percent of the vehicles intercepted for interview at the external stations were passenger cars, most of which were registered within the State of Illinois. Trip purposes were defined in the same way as for the home interview survey, except that home was excluded as a possible trip purpose.

Slightly over half of the auto drivers interviewed reported work as their trip purpose, with social-recreational and shopping being the next

Table 6
VEHICLE TYPE AND PURPOSE REPORTED IN EXTERNAL SURVEY

	Vehicle Type						
Purpose	Auto, Out-of-State	Auto Illinois	Single Unit Truck	Combination Truck	Other	Total	Percent
Work	566	11,032	3,419	1,687	22	16,727	58.0%
Personal Business	47	1,290	82	-	0	1,418	4.9
Medical-Dental	13	950	12	-	0	976	3.4
School	8	356	8	-	37	413	1.4
Social-Recreational	705	4,496	166	-	2	5,369	18.6
Change Mode	0	17	0	-	0	17	0.1
Eat	5	124	18	-	0	148	0.5
Shopping	41	2,522	193	-	0	2,755	9.6
Serve Passenger	9	744	13	-	52	818	2.8
Unknown	101	58	20	29	0	204	0.7
Total:	1,496	21,590	3,931	1,717	113	28,845	100.0%
Percent:	5.2%	74.9%	13.6%	6.0%	0.3%	100.0%	

most frequently reported purposes. For drivers of vehicles registered outside of Illinois, social-recreational was the most frequently reported trip purpose, which suggests that a large number of these drivers were vacationers.

Trucks accounted for a majority of the remaining 20 percent of vehicles intercepted at external survey stations, although a small number of buses and special service vehicles were included. As anticipated, work was the most commonly reported purpose for truck travel. A significant number of single unit truck trips were made for other purposes, however, indicating that in many households a pickup truck was used for travel ordinarily performed in a passenger car.

A tabulation of vehicular travel by types of trip interchange is listed in Table 7. Auto and truck trips have been divided into three categories of trip interchange. Internal trips are those for which both the origin and destination lay within the study area. External-local trips included those with either an origin or destination outside the bounds of the study area and with the other trip end inside. The third category, external-through travel, included all trips with neither origin nor destination within the study area. Trucks accounted for only 11 percent of total vehicular travel in the study area. About 19 percent of external-local trips and over 25 percent of external-through trips were made by trucks, however.

TRAFFIC MODEL CALIBRATION

Traffic models are mathematical equations used for the simulation of travel patterns. By the use of properly calibrated models, the transportation planner is able to forecast future traffic volumes associated with detailed projections of regional development. The general forms of models used in this study have been tested by application in numerous earlier studies. Model calibration involved the computation of model parameters that are uniquely representative of the Decatur urbanized area.

Table 7
VEHICLE TRIPS BY TYPE OF INTERCHANGE

Type of Interchange	Vehicle			
	Autos	Trucks	Total	Percent
Internal	302,100	34,600	336,700	92.1%
External-Local	20,500	4,800	25,300	6.9
External-Through	2,600	900	3,500	1.0
Total:	325,200	40,300	365,500	100.0%
Percent:	89.0%	11.0%	100.0%	

Calibration of traffic models is basically a trial-and-error process. Though several techniques have been developed for the computation of model parameters, the critical test used was application of models to estimate known 1964 travel patterns for the same period. Models were considered to be satisfactorily calibrated when the comparison of *estimated* and *surveyed* travel patterns satisfied certain statistical checks.

Three types of travel models were calibrated. In order of their use for travel forecasting these are: (1) trip generation models, a series of equations by which the number origins of trip and destinations is estimated from socioeconomic data; (2) trip distribution models, a series of equations by which the number of trip interchanges between specific zones is estimated; and (3) the traffic assignment network, a means of simulating a street and highway system for electronic data processing. A detailed description of model calibration is described in Interim Report 7.

Trip Generation Models

Trip generation equations prepared for this study related the number of trip ends (origins and destinations) in a traffic zone to socioeconomic data for the zone. The number of trip ends was mathematically expressed as a linear function of socioeconomic parameters. These equations were of the general form:

$$y = a + b_1x_1 + b_2x_2 + \dots + b_nx_n$$

where $\underline{y}$ equals the number of trip ends, $\underline{a}$ equals the $\underline{y}$ intercept, $\underline{x_n}$ equals a socioeconomic statistic, and $\underline{b_n}$ equals an equation coefficient.

Trip ends were stratified into eight general categories for the analysis of trip generation. Six of these equations were developed for the estimation of person-trip ends, corresponding to trip data collected in the home interview survey, and two were developed for the estimation of truck trip ends.

For trip generation analysis, origin and destination data were converted to an equivalent production and attraction form. For all home-based trips, the home end was defined as the zone of production and the other end as the zone of attraction. For non home-based trips and all truck travel, zones of production and attraction corresponded to origin and destination zones, respectively. The home-based productions and attractions identified in the home interview survey were further stratified as work or non-work trips, resulting in a total of eight types of trip ends.

The fact that travel data had been collected from a small sample required some modification of the standard trip generation analysis techniques. Ordinarily, trip generation analyses are conducted at the traffic zone level. This was not possible with data from the small sample, however, since a substantial part of the variations in the number of trip ends recorded by zone was due to the variation in sampling rates by zone. This effect was satisfactorily reduced by aggregating travel data and socioeconomic data to a larger area called a traffic district.

The precise forms of mathematical equations relating travel data to socioeconomic data were determined by means of multiple linear regression analyses. Each category of trip ends was separately analyzed, using techniques programmed for electronic data processing. In a multiple linear regression analysis, the constant and coefficients of a linear equation are determined so that the equation will best fit relationships between trip data and socioeconomic data inventoried for all traffic districts.

Equations derived from the district level trip generation analyses are listed in Table 8. The equations were tested by application to inventoried socioeconomic data, for comparison of the estimated number of trip ends (productions or attractions) with the corresponding number of trip ends identified in the travel surveys. A listing of observed and estimated trip ends by district and trip end category was studied to identify zones which required a "special generator" analysis, or zones in which unique traffic-generating features would invalidate the use of the area-wide equations. No special traffic generators were identified, however.

Summary statistics for trip generation equations derived at the district level are listed in Table 9. These are standard statistical checks of trip generation equations which provide a measure of the reliability and precision of the equations. Equations for the estimation of home-

Table 8
DISTRICT TRIP GENERATION EQUATIONS

			Coefficients of Independent Variables				
Dependent Variable	Mean	Constant	Dwelling Units	Population	Cars Garaged	Total Employment	Retail Employment
1	1,602	16.5	-	0.851	-	-	-
2	4,050	- 19.7	-	-	5.532	-	-
3	1,141	23.3	1.127	-	-	0.341	6.280
4	410	78.7	0.497	-	-	0.131	0.743
5	1,156	237.7	-	-	-	1.401	3.070
6	2,890	125.9	-	1.146	-	-	17.378
7	1,130	49.7	-	0.443	-	-	6.889
8	408	72.2	0.505	-	-	0.148	0.641

Key to Dependent Variables:

1 - Home-based work person-trips produced.
2 - Home-based non-work person-trips produced.
3 - Non home-based person-trips produced.
4 - Truck trips produced.
5 - Home-based work person-trips attracted.
6 - Home-based non work person-trips attracted.
7 - Non home-based person-trips attracted.
8 - Truck trips attracted.

Table 9
SUMMARY STATISTICS FOR TRIP GENERATION EQUATIONS

Number of Observations	Mean	Multiple R	SEE	Coefficient of Variation	"t" Test on Coefficients			
					Independent Variables	Coef.	SEC	"t"
Home-Based Work Person-Trips Produced								
60	1,602	0.94	617	38.5%	Population	.851	.041	20.74
Home-Based Non-Work Person-Trips Produced								
60	4,050	0.92	1,815	44.8%	Cars	5.532	.303	18.24
Non Home-Based Person-Trips Produced								
91	1,141	0.94	678	59.4%	Dwelling Units	1.127	.124	9.07
					Total Employment	.341	.101	3.39
					Retail Employment	6.280	.477	13.17
Truck Trips Produced								
91	410	0.83	299	72.9%	Dwelling Units	.497	.055	9.08
					Total Employment	.131	.044	2.94
					Retail Employment	.743	.210	3.54
Home-Based Work Person-Trips Attracted								
91	1,156	0.89	870	75.2%	Total Employment	1.401	.129	10.84
					Retail Employment	3.070	.597	5.14
Home-Based Non-Work Person-Trips Attracted								
91	2,890	0.88	2,459	85.1%	Population	1.146	.151	7.61
					Retail Employment	17.378	1.367	12.71
Non Home-Based Person-Trips Attracted								
91	1,130	0.94	641	56.7%	Population	.443	.039	11.26
					Retail Employment	6.889	.357	19.31
Truck Trips Attracted								
91	408	0.83	294	72.2%	Dwelling Units	.505	.054	9.37
					Total Employment	.148	.044	3.39
					Retail Employment	.641	.207	3.09

based work and non-work, person-trip productions were found to be the most precise. Estimation of truck trip ends was complicated by the difficulty of obtaining an accurate inventory of trucks garaged by zone. The socioeconomic inventory of trucks was based on vehicle registration records, which frequently prove to have a different address than the place at which the truck is actually garaged. Person-trip attractions are typically difficult to estimate, and this is particularly true of data from a small sample survey. Although these latter equations are less precise than the equations for home-based trip productions, all equations were evaluated and considered to be statistically satisfactory for travel forecasting.

Since traffic zones are the basic geographic units for traffic modeling, it was necessary to convert the trip generation equations derived at the *district* level to a set of equations applicable at the *zone* level. After the analysis of several alternate techniques, it was decided to use district level equations with district socioeconomic data to develop control totals for the number of trip ends in each traffic district. Trip ends by zone were estimated with modified trip generation equations (listed in Table 10) and adjusted to match district control totals.

Zone trip generation equations were derived in the following manner. The constants in equations derived at the district level were multiplied by a factor equal to the number of districts (91) divided by the number of zones (208). This modification compensated for the difference in the number of times constants would be added for application of equations at the district or zone level. After comparison of the sum of trips estimated for the several zones in a district with district control totals, individual zonal estimates were adjusted by proration to exactly equal district controls.

Person-trips estimated by trip generation analyses were, for the purposes of travel forecasting, assumed to fall into two general classes. One general classification included auto-oriented travel, which is composed of auto driver and auto passenger trips. The second general classification was transit. Based on a study of current transit patronage, models were developed for the forecasting of future transit trips made on a typical weekday. Transit trip ends were estimated so that they might be subtracted from person-trip ends, resulting in an estimate of auto-oriented travel.

Commonly used techniques for the analysis of transit passenger volumes were not applicable in the Decatur area for two reasons. First, transit system operations were too limited to permit use of the sophisticated modal-split technique developed for larger urban areas. The usual technique involves analysis of variations in transit trips associated

Table 10
ZONE TRIP GENERATION EQUATIONS

		Coefficients of Independent Variables				
Dependent Variable	Constant	Dwelling Units	Population	Cars Garaged	Total Employment	Retail Employment
1	7.2	-	0.851	-	-	-
2	-8.6	-	-	5.532	-	-
3	10.2	1.127	-	-	0.341	6.280
4	34.4	0.497	-	-	0.131	0 743
5	104.0	-	-	-	1.401	3.070
6	55.0	-	1.146	-	-	17.378
7	21.7	-	0.443	-	-	6.889
8	31.5	0.505	-	-	0.148	0.641

Key to Dependent Variables:

1 - Home-based work person-trips produced.
2 - Home-based non-work person-trips produced.
3 - Non home-based person-trips produced.
4 - Truck trips produced.
5 - Home-based work person-trips attracted.
6 - Home-based non-work person-trips attracted.
7 - Non home-based person-trips attracted.
8 - Truck trips attracted.

with different levels of transit service. In the Decatur area, transit services were limited to nine routes, all of which operated with 30-minute headways. Consequently, variations in transit service were too insignificant to be correlated with variations in passenger volumes. Second, the combination of a small home interview survey sample and the very small proportion of total daily travel represented by transit trips produced too few trip records for adequate representation of typical daily transit patronage.

Transit passenger volumes were analyzed by using survey data and summaries prepared for the Transit Ridership Improvement Project Survey, conducted by the Bureau of Economic and Business Research of the University of Illinois. For this survey, about 2,600 transit passengers were interviewed during the spring of 1964. Since the survey had been specifically designed for the evaluation of zone-fare and subscription transit systems, data required adaptation to transportation study techniques. Origins and destinations had been coded to a total of 36 distinct route sections. The equivalency of route sections and traffic zones was established so that travel data could be related to corresponding socioeconomic data.

The technique employed for estimation of transit passenger data is known as a zonal rate analysis. In other words, it was hypothesized that the number of transit trips generated per dwelling unit in a zone is related to socioeconomic characteristics of the traffic zone. The precise form of the estimating equations was determined by regression analyses, similar to those described for the trip generation analysis.

Income per dwelling unit and distance to the central business district were the most effective parameters for estimating transit trip generation rates. Separate equations were derived for estimating total transit trips per dwelling unit and work transit trips per dwelling unit. Zones also were stratified according to their proximity to the central business district, to define different generation rates for zones within the central business district, within three-quarters of a mile from the central business district, and over three-quarters of a mile from the central business district. Grouping of zones in this manner was determined by the review of graphical plots of trip generation rates versus median family income by zone, showing distance to the central business district by a symbol for each observation. Equations derived for estimating transit trip generation are listed in Table 11.

The variables shown in these equations are defined as follows. "DU" represents the count of dwelling units within the zone. "SA" represents service availability, computed as the fractional amount of zonal dwelling units lying within one-quarter mile of a transit route. The last variable 'MI," represents median family income for the zone, in thousands of dollars. Application of these equations with the variables which were inventoried or forecasted for each zone in the transit service area resulted in an estimate of total transit trips and work transit trips, by zone. Non-work

Table 11
TRANSIT TRIP GENERATION EQUATIONS

Trip Category	Distance to CBD	Equation
Total Transit Trips	Within CBD	0.13 x DU x SA
Work Transit Trips	Within CBD	0.11 x DU x SA
Total Transit Trips	3/4 Mile or Less	0.07 x DU x SA
Work Transit Trips	3/4 Mile or Less	0.03 x DU x SA
Total Transit Trips	Over 3/4 Mile	(0.26-0.025 x MI) x DU x SA
Work Transit Trips	Over 3/4-Mile	(0.15-0.019 x MI) x DU x SA

transit trips were then estimated by subtracting work trip estimates from total transit trip estimates.

The zonal distribution of attracted transit trips was determined in the following manner. In the 1964 survey, a majority of attracted transit trips were located in the central business district, with 59 percent of work trips and 74 percent of non-work trips attracted to the central business district. It was assumed that future transit trips would continue to show these same proportions of attraction to the central business district, which is partially induced by the fact that all transit routes are oriented to the central business district.

After proportioning, the attracted trips were distributed among central business district zones and other zones within the transit service area by proration.

As a final evaluation of reliability, the equations employed to estimate transit trips were used to estimate 1964 transit passenger volumes by route. The estimates were compared with similar statistics provided by transit officials and with passenger counts made during the 1964 transit survey. The total number of transit riders on a typical day compared closely, and estimates of ridership by route were considered to be satisfactory. The end result was a record of transit trip productions and attractions by general purpose for each traffic zone within the transit service area. These are subtracted from *total* person-trip ends to estimate auto-oriented travel.

The number of auto driver trips associated with a particular number of auto-oriented trips was estimated by application of auto occupancy factors. Auto driver trips are directly equivalent to passenger car movements on a typical weekday, which largely determines the capacity required of the street and highway system. Auto occupancy factors represent the average number of riders in an automobile for trips of a specific purpose.

Since three general purpose categories had been defined for person-trips, three auto occupancy factors were required. Factors were computed as the number of the auto-oriented trips divided by the number of auto driver trips made for a specific purpose. In the 1964 survey an average 1.41 occupants were reported for all automobile trips. By general purpose, the factors ranged from a low of 1.14 persons per trip for the home-based work purpose, to a high of 1.62 persons for home-based, non-work trips. The factor for non home-based trips was 1.29. The overall average and variations in auto occupancy by trip purpose were similar to that observed in most origin-destination surveys.

The number of passenger car movements on a typical weekday was estimated by dividing person-trip productions and attractions by the corresponding auto occupancy factor. Truck trips (estimated by trip generation equations) were added to these auto trips to complete the simulation of vehicular travel by residents of the area on a typical weekday.

Trip Distribution Models

The second general type of traffic model are the trip distribution models used to estimate the number of trip interchanges that occur between specific zones and stations. A separate trip distribution model was calibrated for each of the four general trip purposes. Although the trip generation equations are used to estimate the number of trips produced or attracted in each zone, this step provides no information regarding the distribution of these trips between zones and stations.

Trip distribution models calibrated for this study were of the gravity model type. Gravity model theory assumes that trips produced by a given zone will be attracted to all other zones in the area to varying degrees. The degree of attraction to a particular zone is directly related to the total number of trips attracted to that zone and is inversely related to the travel time between the zone of production and the investigated zone of attraction.

The mathematical statement of each gravity model takes the general form:

$$T_{i-j} = \frac{P_i A_j F_{i-j} K_{i-j}}{\sum_{j=1}^{n} A_j F_{i-j} K_{i-j}}$$

where T_{i-j} equals trips from zone i to zone j, A_j equals total trip attractions in zone j for the general purpose, F_{i-j} equals the travel-time factor corresponding to the spatial separation of zone i and zone j, and K_{i-j} equals the specific adjustment factor for socioeconomic influences on travel from zone i to zone j.

Pi and Aj, representing vehicle trips produced and attracted by zone by general purpose, are derived as the end product of the trip generation analyses. The computation of F and K factors for each of the four general purposes is known as the calibration of the trip distribution models.

Limitations imposed by the small size of the sample in the origin-destination survey posed special problems for the calibration of trip distribution models. The calibration process is started by computing F (travel-time) factors. Accuracy of these trip distribution models is tested by comparing zonal interchanges estimated by the models with corresponding trip interchanges recorded in the travel surveys. For those zonal interchanges in which the comparison is poor, the effects of topographical barriers are simulated by the trial and error adjustment of travel times between zones on either side of the barrier. The last step in trip distribution model calibration generally involves the computation of K factors.

In this study, two variations from the standard trip distribution model calibration techniques were employed. The step involving computation of K factors was deleted from the process. Due to the large expansion factors associated with the small survey sample, it was believed that the interzonal movements recorded by the travel surveys would be more strongly affected by biases in origin-destination survey data than by actual socioeconomic influences. An additional step was added to the usual calibration process. The 1964 trip interchanges estimated by gravity models were used in a traffic assignment, so that the resulting assigned volumes could be compared with corresponding traffic counts on actual street and highway system facilities.

Trial F factors were evaluated by the comparison of trip length frequency distributions recorded in the travel surveys and produced by the gravity models. A trip length frequency distribution is a record of trip interchanges according to the travel time required for the trip, measured in minutes. The distribution is represented as the proportion of total trip interchanges recorded by one-minute increments of travel time.

Travel time required for a particular zone-to-zone movement is strongly dependent upon the interzonal driving time. The traffic assignment network, described in the following section of this chapter, makes it possible to estimate the time required to drive a vehicle from a given zone to any other zone. Two other factors also are considered for the computation of travel time, however.

A terminal time was added to each end of a trip for representation of time losses in the immediate vicinity of the trip origin and destination. Terminal times simulate the time spent entering or leaving a parking place and walking from or to the automobile and the actual trip origin or destination. These times ranged from a minimum value of one minute in rural and suburban zones to a maximum value of five minutes in central business district zones.

It also was necessary to specify an intrazonal travel time for each zone, representing the average time required for a trip that does not leave the bounds of the zone. The travel distance for intrazonal trips was estimated as half the average distance from boundary to boundary of the zone. Travel speeds assumed for intrazonal trips ranged from 10 miles per hour in intensely developed central business district zones to 20 miles per hour in rural zones.

The total travel time required for a trip was determined as the sum of terminal time at the origin zone, driving time between the zones as determined from the traffic assignment network, and terminal time at the destination zone. For an intrazonal trip, intrazonal travel time was substituted for driving time between zones, but terminal times were still added to each end of the trip.

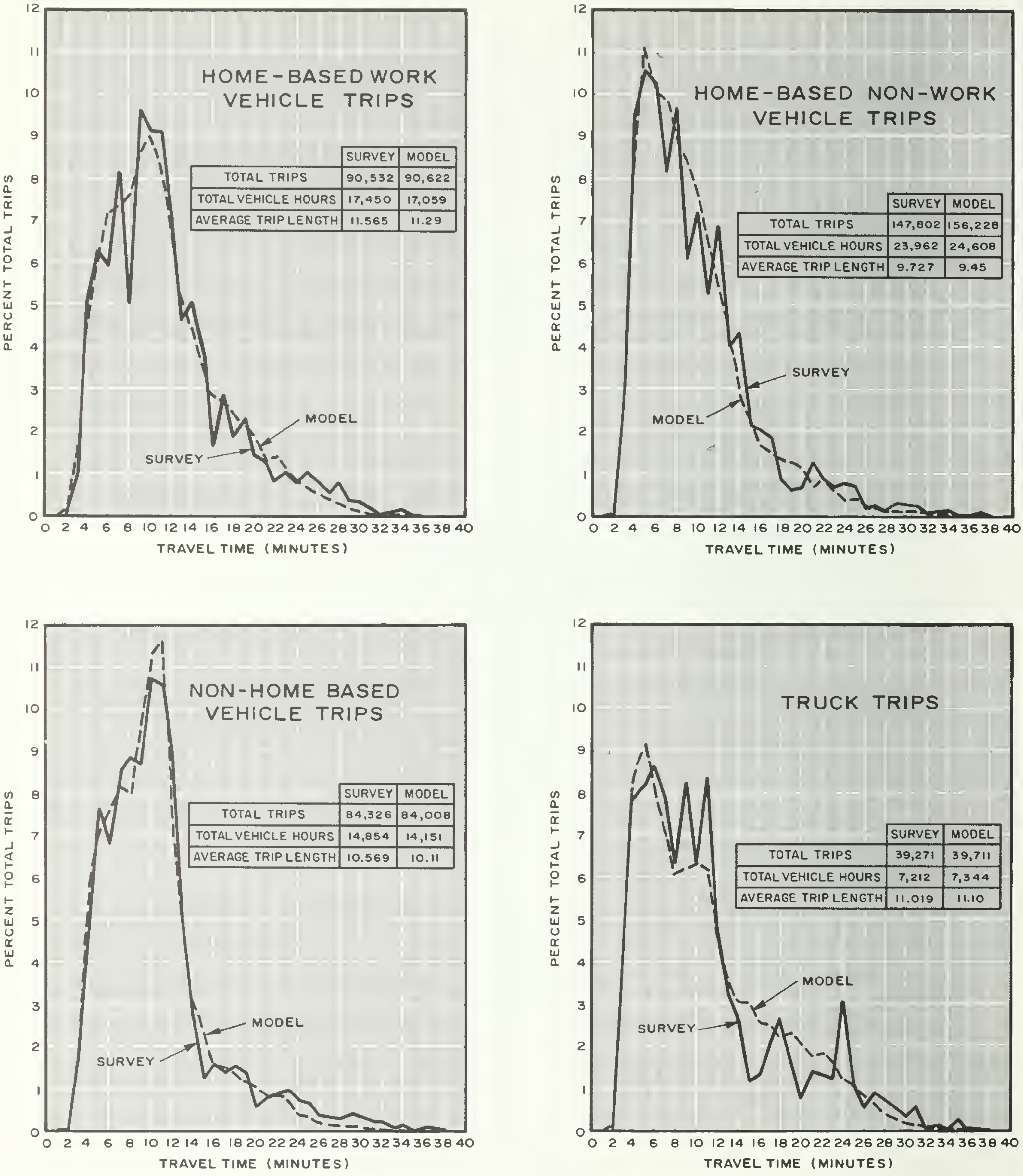
Three adjustments were made to trial F factors based on the comparison of trip length frequency distributions from the surveyed trip interchanges and models. After satisfactory agreement had been achieved between the estimated and surveyed trip length frequency distributions, the resulting models were used to distribute synthesized trip productions and attractions for evaluation by traffic assignment.

Evaluation of the traffic assignment results, and changes in the trip length frequency distributions caused by use of synthesized trip productions and attractions, indicated that two types of model adjustment would be required. Gravity models routed the synthesized trips over too long a distance, as indicated by generally high assigned volumes, and by longer average trip lengths for the model outputs than for interchanges recorded on the travel surveys. This was corrected by further adjustment of F factors. It also was noted that the number of vehicles crossing Lake Decatur and the Sangamon River was significantly overestimated by gravity models. This was corrected by adding a three-minute time penalty to all trip interchanges between zones on opposite sides of Lake Decatur and the Sangamon River.

Following these adjustments,a traffic assignment of synthesized trips showed actual street and highway traffic counts to be adequately simulated by traffic assignment network volumes. A final check on the comparison of surveyed and estimated trip length frequency distributions also was made, as displayed in Figure 12. The shape of these distribution curves (skewed right) is similar to that found in most origin-destination surveys. The average trip length reported by residents of the area required a total travel time of slightly over 10 minutes, although trip lengths ranged from as short as two minutes to as long as 40 minutes.

Traffic Assignment Network

The third type of model calibrated for the area was the traffic assignment network. A traffic assignment network simulates an arterial street and highway system for traffic assignment by computer. The traffic assign-



HOME-BASED WORK VEHICLE TRIPS

	SURVEY	MODEL
TOTAL TRIPS	90,532	90,622
TOTAL VEHICLE HOURS	17,450	17,059
AVERAGE TRIP LENGTH	11.565	11.29

HOME-BASED NON-WORK VEHICLE TRIPS

	SURVEY	MODEL
TOTAL TRIPS	147,802	156,228
TOTAL VEHICLE HOURS	23,962	24,608
AVERAGE TRIP LENGTH	9.727	9.45

NON-HOME BASED VEHICLE TRIPS

	SURVEY	MODEL
TOTAL TRIPS	84,326	84,008
TOTAL VEHICLE HOURS	14,854	14,151
AVERAGE TRIP LENGTH	10.569	10.11

TRUCK TRIPS

	SURVEY	MODEL
TOTAL TRIPS	39,271	39,711
TOTAL VEHICLE HOURS	7,212	7,344
AVERAGE TRIP LENGTH	11.019	11.10

FIGURE 12:
COMPARISON OF 1964 SURVEY AND MODEL
TRIP LENGTH FREQUENCY DISTRIBUTIONS

ment process enables a transportation planner to predict the flow of traffic on a complex street and highway system.

The traffic assignment network contains a link for each section of the arterial street and highway system it represents. Trips made between a particular pair of traffic zones ordinarily may be assigned to many different series of links, just as a driver has a choice of many different streets to make a particular trip. In the traffic assignment process, trips from one zone to another are assigned to the series of links forming the *minimum time path* between the two zones. Traffic volumes on a specific section of route is estimated as the sum of all zone-to-zone movements assigned to the corresponding network link. The use of electronic data processing techniques is necessary for traffic assignment, due to the large number of computations involved. In this study, the area was divided into a total of 222 zones and stations. This number of zones and stations results in nearly 50,000 different trip interchanges to be considered in the traffic assignment process. Whereas the manual processing of such a large number of computations would require months or years, electronic data processing techniques enable the transportation planner to complete the allocation of zonal interchanges to network links in an hour or less.

The traffic assignment network is described by link data. These data are coded on punched cards which describe each link for computer processing. The first step in the preparation of link data was drafting of a traffic assignment network map. A traffic assignment network map shows the arterial street and highway system drawn to scale and also shows the location of the centroid of activity for each traffic zone. The end points of links, corresponding to intersections of arterial streets, were numbered to identify each link and to show the connections between links. Centroids of activity representing the traffic zones were connected to the arterial street and highway system links by centroid connectors, which simulate the local street system. (Trips are distributed to arterial streets and highways by the local street system.)

A link data card was coded for each centroid connector and link of the traffic assignment network. Data recorded included the number assigned to either end point, the length of the link in miles, travel speed on the link in miles per hour, and its theoretical traffic-carrying capacity.

Calibration of a traffic assignment network involves the adjustment of link travel speeds for the best simulation of actual traffic movements. An initial set of link travel speeds was determined by means of a travel time study. About one-third of the actual arterial street and highway system was covered by the travel time study. Travel speeds varied both with location in the area and with the type of route being traveled. Average travel speeds recorded in the survey are listed in Table 12.

Four areas were defined for the summary of travel time survey data. The central business district corresponded to the area bounded by Eldorado,

Table 12
FIRST TRIAL LINK TRAVEL SPEEDS

Location	Functional Classification			
	Expressway	Major Street	Collector Street	Centroid Connector
Central Business District	-	18	14	8
Intermediate	-	24	23	10
Suburban	50	34	28	15
Rural	55	45	40	15

Decatur, Broadway, and Church Streets. Speeds in this area were restricted by conflicting pedestrian traffic, as well as the frequent stopping and starting of motorists maneuvering for parking spaces and dropping off or picking up passengers. The intermediate area was bounded by Pershing Road, 22nd Street, Lake Shore Drive, and Fairview Avenue. In this area pedestrian conflicts and the stopping and starting of motorists also restricted speeds, but not so much as in the central business district. In the suburban area, residential development was less dense and the major restriction upon speed was imposed by legal speed limits. The highest speeds were recorded in the rural area, where the sparse development of abutting land-uses placed little or no restriction on movements.

Three types of route were defined for the summary of travel speeds. Collector routes are those streets and highways which are primarily intended to collect traffic from local streets. Major facilities correspond to streets in the arterial system, along which local and collector cross-street traffic is generally controlled by stop or yield signs. The expressway designation is assigned to facilities along which partial control of access is exercised.

Travel speeds assigned to links of the traffic assignment network were determined by the location and functional classification of the corresponding facility in the actual street and highway system. Although minor adjustments to the link travel speeds were required during the calibration process, speeds listed in Table 12 generally were satisfactory except for expressway facilities. In order to achieve a satisfactory simulation of the actual traffic movements, link speeds for expressways in suburban and rural areas were lowered to 39 and 45 miles per hour, respectively.

After the travel speeds had been determined for all links in the traffic assignment network, it was possible to compute time required for travel between any two points in the study area by electronic data processing techniques. Standard computer programs were used to determine the time required to travel over each segment of the network, based on link lengths and travel speeds. These also were used to determine the shortest time path between all pairs of zones. The results of computations for travel times from the central business district to all other parts of the study area are displayed in Figure 13.

The accuracy of the traffic assignment network description was evaluated by comparing volumes assigned to specific links with average daily traffic volumes counted on corresponding street and highway facilities. Network calibration is a trial and error process, in which the results of a traffic assignment are used to modify the link travel speeds to be used in subsequent assignments. Several traffic assignments were necessary to achieve satisfactory simulation of actual traffic counts, and two sets of zone-to-zone trip interchanges were used.

The first set of zone-to-zone trip interchanges assigned for the network calibration process were trips recorded in the origin-destination travel surveys. Along with the comparison of assigned and counted volumes for specific links, generalized traffic movements were studied by comparing screenline crossings and corridor volumes. Four screenlines were defined; these bisected the area north, south, east, and west of the central business district. Comparison of assigned volumes and traffic counts on facilities crossing the screenlines checked within a few percent.

Traffic corridors were defined as parallel streets in close proximity to one another, so that they served the same traffic movements. Analysis of volumes on a corridor basis is appropriate in view of the "all-or-nothing" traffic assignment employed in this study. The term "all-or-nothing" refers to the fact that all the trip interchanges between a pair of zones were assigned to the single minimum time path between the two zones, even though an alternative route might be only a fraction of a minute longer. On the actual street and highway system, various drivers with the same trip origin and destination might use any of several routes in a corridor, depending on the congestion encountered or their personal preference for a specific route. This sometimes results in a disproportionate amount of the volume in a corridor being assigned to one route. Although volumes assigned to specific links may be affected by the all-or-nothing aspect of traffic assignment, this may be compensated for in the analysis of corridor volumes.

For the first few traffic assignments, corridor volumes, based on trip interchanges recorded in travel surveys, compared poorly in several instances when assigned volumes were checked against corresponding ground counts. Several discrepancies in corridor volumes were attributed to the small size of the sample origin-destination surveys, since the travel in traffic zones for which interviews had been completed required over-expansion for representation of travel associated with zones in which interviews had not been completed. Consequently, area-wide travel patterns were properly represented, but travel in the immediate vicinity of numerous traffic zones was significantly under-reported or over-reported.

Final calibration of the traffic assignment network was based upon a record of zone-to-zone trip interchanges synthesized by the application

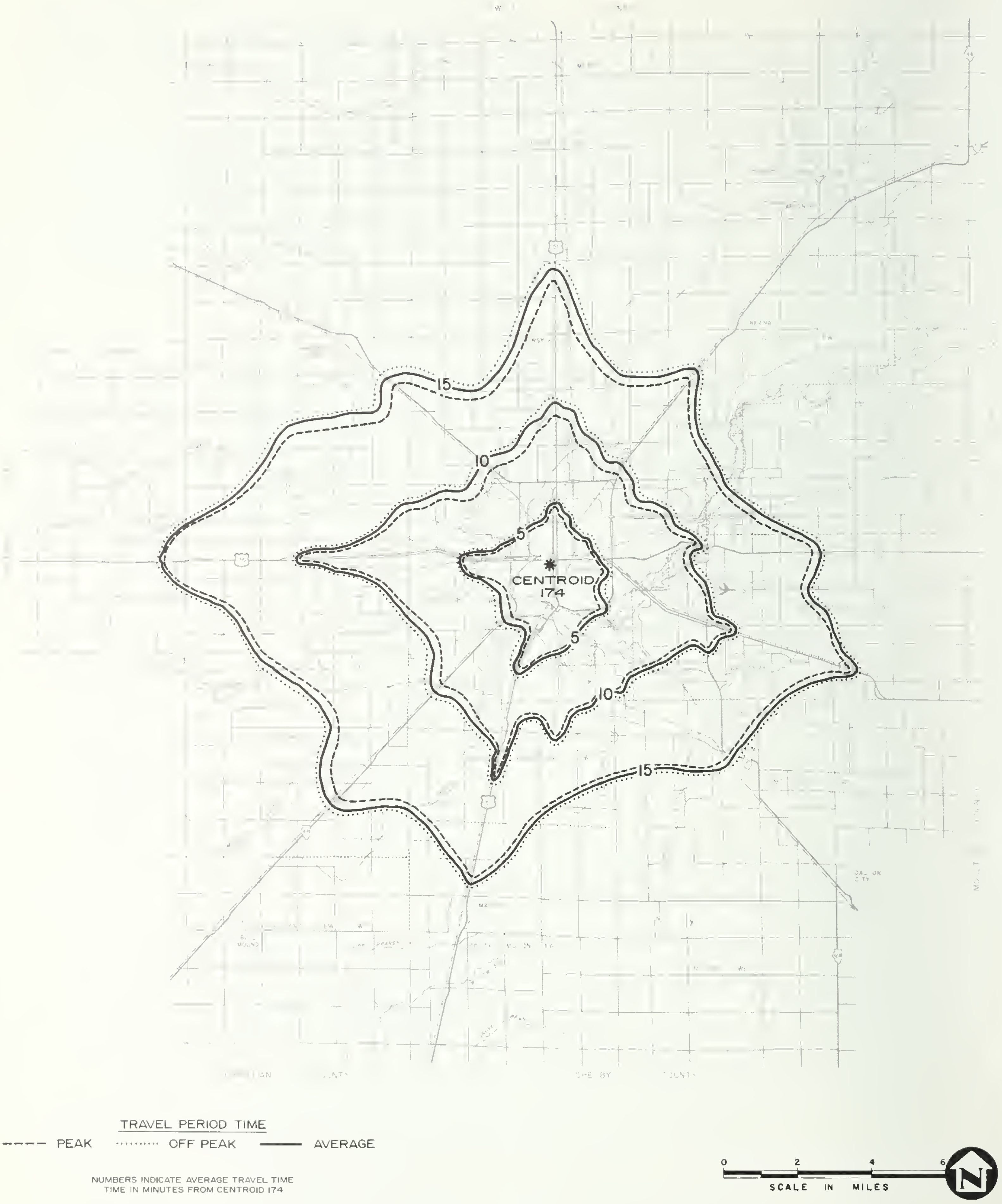


FIGURE 13:
TRAVEL TIME FROM CENTRAL BUSINESS DISTRICT

of trip generation and trip distribution models. These synthesized trip interchanges represented a more realistic simulation of actual traffic volumes. In all but a few instances, final assignment volumes based on synthesized 1964 trip interchanges were within 20 percent of corresponding traffic counts.

TRAVEL FORECASTING

The preparation of accurate travel forecasts is a valuable aid to transportation planners. Through this process, the expenditure of funds for transportation facility improvements may be guided by the future needs of the region, as well as by the solution of current problems. The design features of a project (street improvement, etc.) should ensure that the maximum traffic volumes anticipated will be served efficiently during the life of the facility.

Travel forecasts have been prepared for the year 1985. The projections for regional development and future land-use described in Chapters 1 and 2 of this report have been used to predict the travel demands that must be met by the future transportation system. Precise quantification of the future demands for travel facilities was accomplished by applying traffic models to predict travel patterns (and traffic volumes) on a typical weekday in the forecast year, 1985. This forecast is documented in Interim Report 8.

The accuracy of predicted travel patterns is determined by several factors. The planning process implies that transportation technology will not undergo radical changes during the forecast period. This is contingent upon the continued dependence of residents of the region on the automobile as the primary mode of transport. It also is assumed that travel characteristics in the region will remain relatively stable. The efficacy of traffic models in the simulation of actual traffic conditions is strongly affected by changes in travel characteristics. The accuracy of the travel demand predictions for the forecast year are contingent upon urban growth occurring as forecasted. Specific traffic estimates are highly dependent upon the distribution of forecast year population and employment among the traffic zones.

These constraints on the accuracy of future travel patterns are not so prohibitive as they might first appear to be. A distinctive feature of this transportation planning process is the ability to revise travel forecasts in view of unforeseen changes in travel characteristics or urban growth. As discussed in the final chapter of this report, travel characteristics and urban growth will be monitored in the continuing planning process, so that significant changes may be reflected in revised travel forecasts. A principal purpose of this initial study was to develop forecasting techniques, enabling transportation planners to predict future travel patterns associated with the most probable course of urban growth.

Use of Socioeconomic Data in Projections

The starting point in preparation of travel forecasts is the application of trip generation models with socioeconomic data projected by traffic zone. The results of this process for the region as a whole are summarized in Table 13. Socioeconomic data used for the travel forecast have been listed, as well as the projected number of trips by principal modes. It may be noted that trip making is forecasted to increase by a slightly greater proportion than population and employment. An increase of 66 percent in total vehicle trips is estimated, compared with increases of 47 percent and 60 percent in population and total employment, respectively.

Travel projections expressed in terms of trip making per dwelling unit are listed in Table 14. An increase in person-trips (trips by all modes) of about six percent is forecasted compared with a 15 percent increase in auto trips per dwelling unit. These statistics are similar to anticipated trends in travel patterns. An increase in the average number of trips per dwelling unit logically would be expected as family members have more leisure time and greater mobility.

An increase in auto trips per dwelling unit is caused by two factors (in addition to growth in trip-making generally). Past trends in travel characteristics indicate that increased automobile availability results in a slight decrease in the average number of occupants per auto trip. Also, a continued decline in the proportion of trips made via transit has been projected. Each of these factors contributes to the increased number of auto trips per dwelling unit.

In order to estimate the forecast year auto occupancy rates, an analysis was made of past trends in auto occupancy. Origin-destination survey

Table 13
REGIONAL TRAVEL PROJECTION

Statistic	1964 Inventory	1985 Forecast	Growth Factor
Dwelling Units	38,800	57,200	1.47
Population	116,300	171,400	1.47
Cars	45,700	78,300	1.71
Retail Employment	6,800	11,200	1.65
Total Employment	44,800	71,500	1.60
Person Trips(1)	471,800	737,700	1.56
Transit Trips	2,600	1,800	0.69
Auto Trips(1)	322,600	545,700	1.69
Truck Trips(1)	39,300	56,100	1.43
Total Vehicular Trips(1)	361,900	601,800	1.66

(1)External-through trips not included.

Table 14
TRAVEL PROJECTION PER DWELLING UNIT

Statistic	1964 Inventory	1985 Forecast	Growth Factor
Persons per Dwelling Unit	3.00	3.00	1.00
Cars per Dwelling Unit	1.18	1.37	1.16
Person Trips per Dwelling Unit	12.16	12.90	1.06
Transit Trips per Dwelling Unit	0.07	0.03	0.47
Auto Trips per Dwelling Unit	8.31	9.54	1.15

data for cities of a size comparable to Decatur (50,000 to 250,000 population) were used to compute average rates observed within a few years of 1948[1] and within a few years of 1961.[2] Computed rates are listed in Table 15.

It was noted that although autos per person increased substantially (by 59 percent) from 1948 to 1961, only a slight decrease (four percent) in auto occupancy resulted. Also, the auto occupancy rate observed in Decatur in 1964 was well below the average for cities of comparable size. For travel forecasting purposes, it was estimated that auto occupancy in Decatur would decrease slightly (by about one percent in each general purpose category) to equal the average rate for cities of this size extrapolated to 1985

Travel forecasts also reflect a significant change in the relative proportion of trips made for a general purpose. Travel projections by

Table 15
TREND IN AUTO OCCUPANCY

Statistic	Average for 32 Cities Circa 1948	Average for 12 Cities Circa 1961	Decatur 1964
Auto Occupancy	1.57	1.51	1.41
Autos per Person	0.22	0.34	0.39

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[1] "Travel Patterns in 50 Cities," Highway Research Board, Bulletin 203, Washington, D.C., 1958.

[2] Bureau of Public Roads Circular Memorandum, E.H. Holmes, March 9, 1967.

general purpose are listed in Table 16. The greatest growth in travel is expected in the home-based, non-work category. This is consistent with anticipated trends in travel patterns, since greater leisure time may be expected to result in increased social recreational travel.

Growth in trip ends is shown by traffic district in Figures 14 and 15. Traffic zones where the largest increase in travel will occur correspond to those zones in which the greatest proportion of new growth in population and employment was allocated. A substantial increase in travel is predicted for the central area, and particularly the central business district of Decatur. This reflects the anticipated increasing density of development in the central area and the continued dominance of the central business district as the retail trade and services center. Travel increases associated with new urban development are expected to occur at the fringe of the present urbanized area to the north, west, and south, as recently developed areas expand to fill existing available land.

Distribution of Trips

The second step in forecasting future travel was the distribution of trips produced and attracted. The distribution of future travel for estimation of zone-to-zone trip interchanges was largely accomplished by the application of gravity models. The travel time impedance of three minutes applied to trips crossing Lake Decatur and the Sangamon River, determined by a "trial-and-error" process during gravity model calibration, was utilized in distribution of future travel, also. Since levels of service for facilities serving most of the trips crossing this topographical barrier were not changed substantially with the future systems tested, the barrier would be expected to exert a similar influence on future travel patterns. Travel time (F) factors also were used without modification.

Two sets of zone-to-zone trip interchanges were prepared. For the first of these, interzonal driving times were determined by use of a traffic assignment network including only existing street and highway facilities or those for which funds already had been committed. This set of trip interchanges was used to analyze traffic movements and volumes

Table 16
TRAVEL PROJECTION BY GENERAL PURPOSE

General Purpose	1964 Inventory	1985 Forecast	Growth Factor
Home-based Work	90,500	139,900	1.54
Home-based Non-work	147,800	175,300	1.86
Non Home-based	84,300	130,400	1.55
Total:	322,600	545,600	1.66

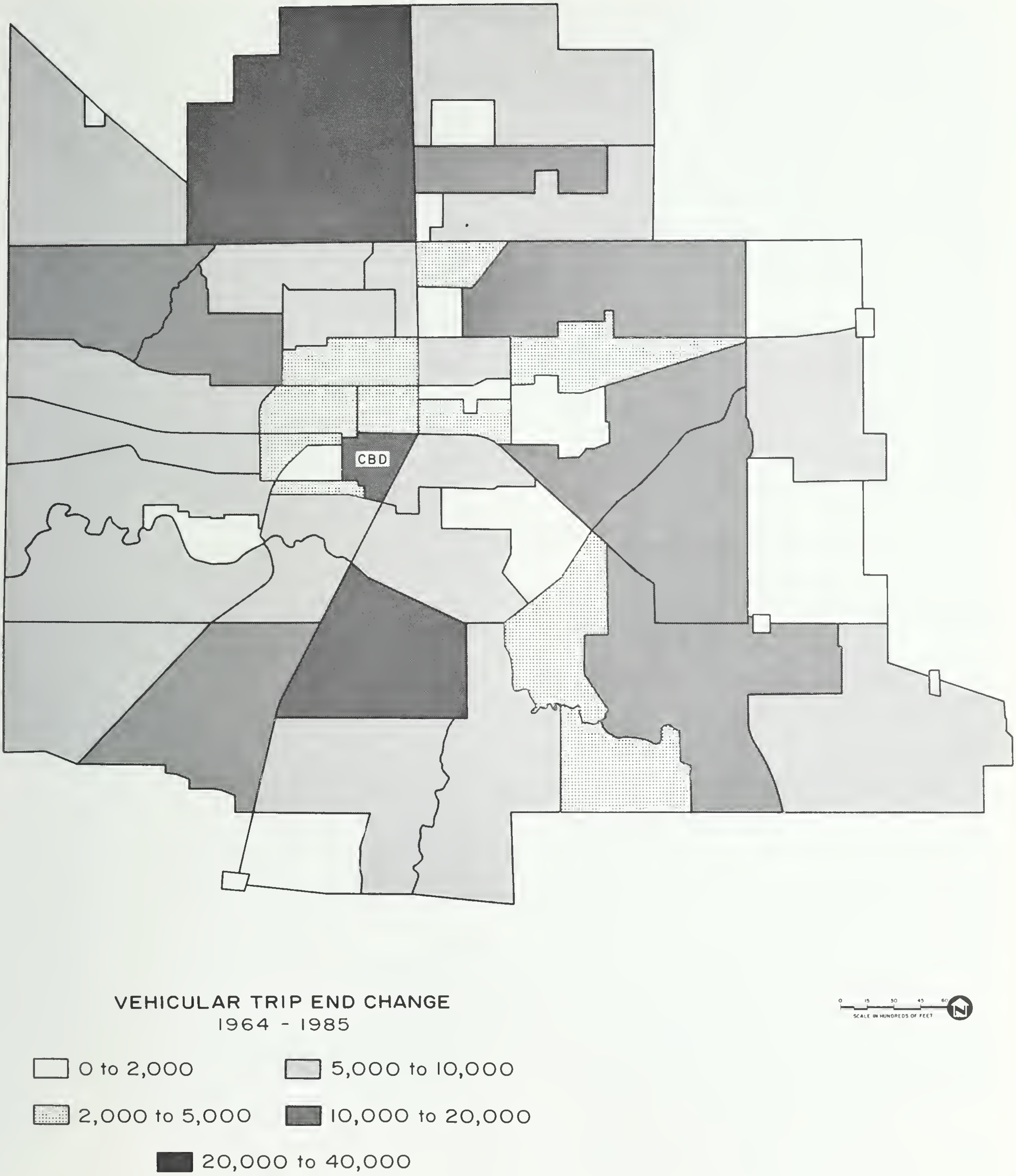


FIGURE 14:
GROWTH IN VEHICULAR TRIP ENDS
STUDY AREA 1

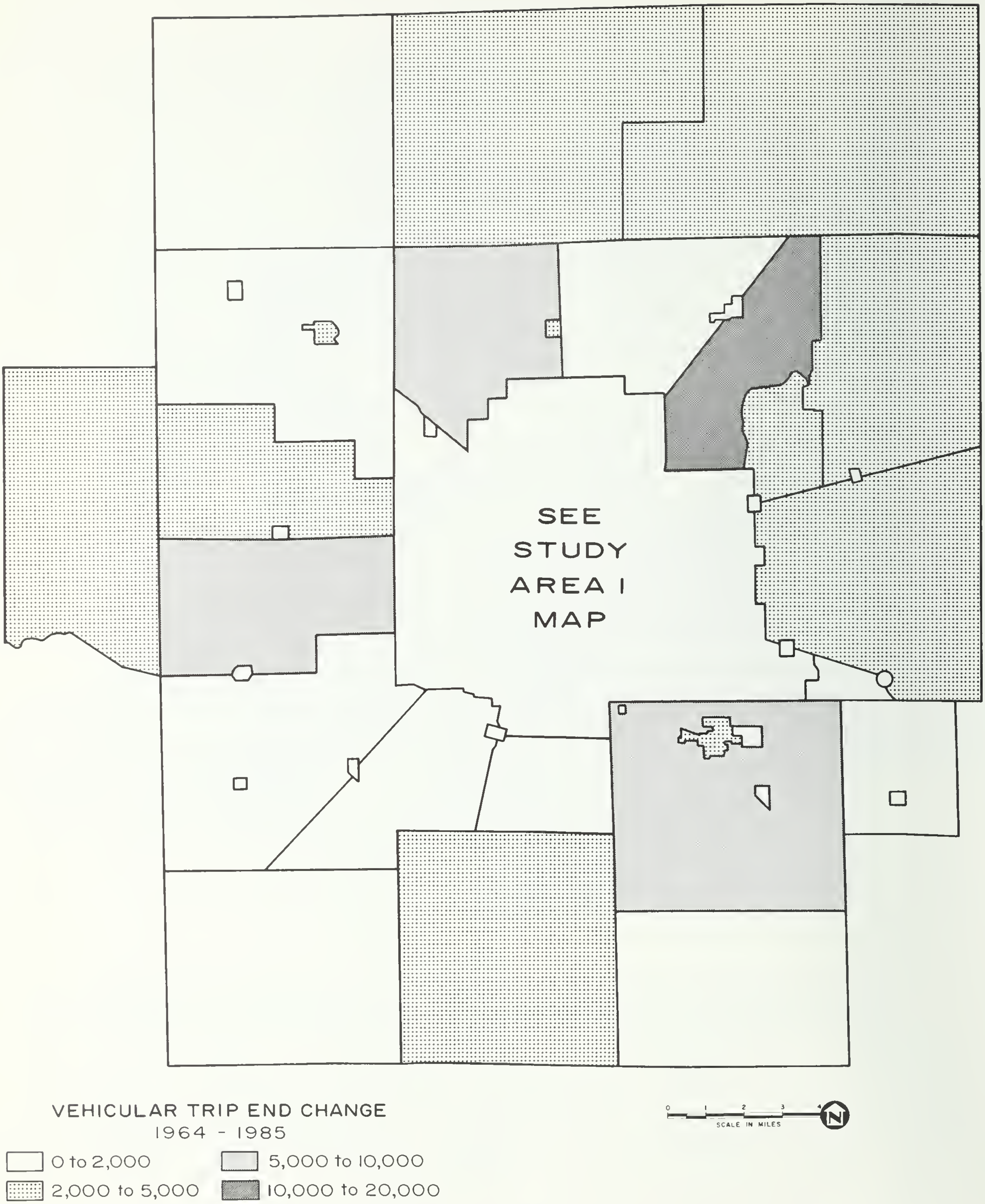
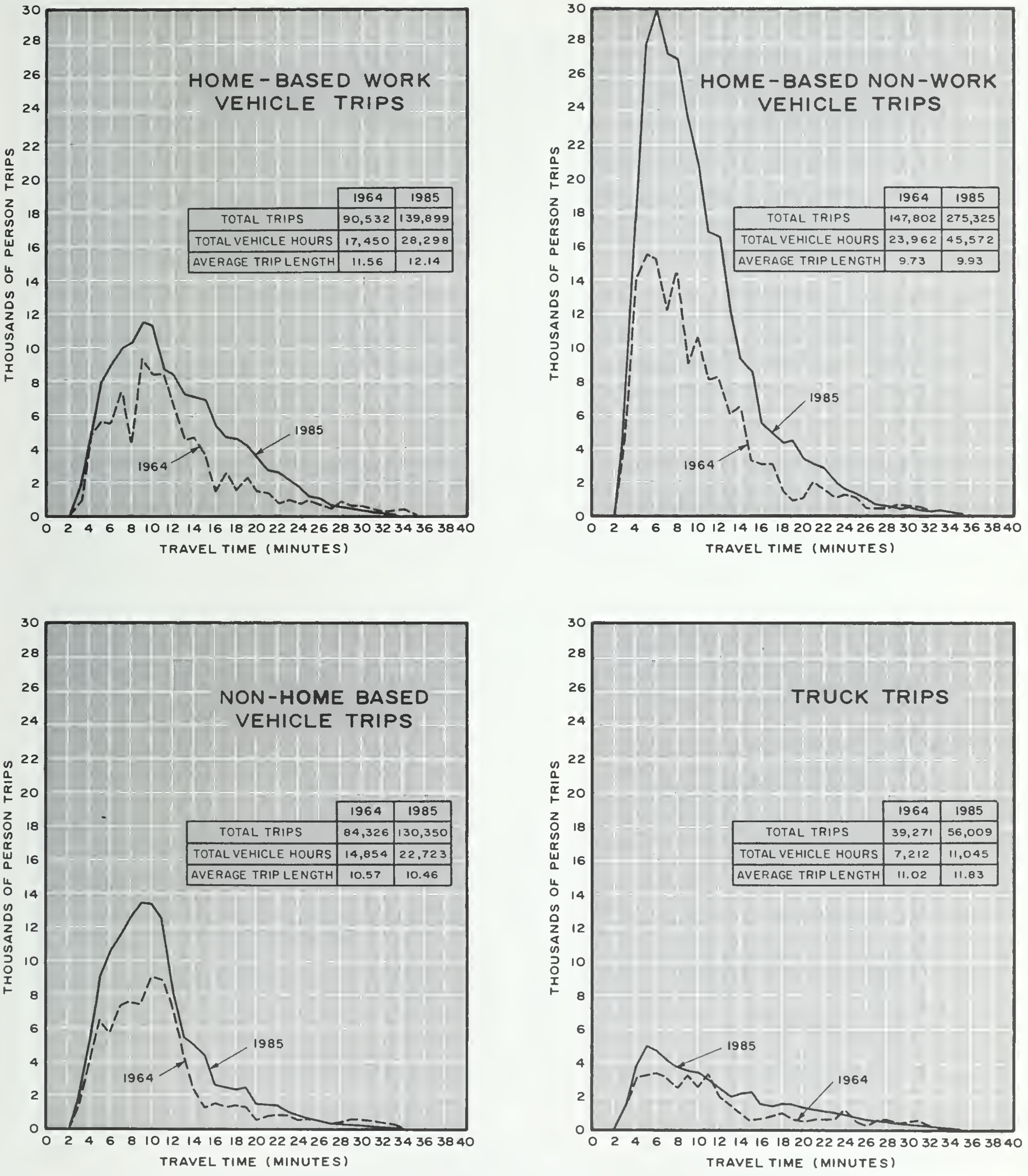


FIGURE 15:
GROWTH IN VEHICULAR TRIP ENDS
STUDY AREA 2



HOME-BASED WORK VEHICLE TRIPS

	1964	1985
TOTAL TRIPS	90,532	139,899
TOTAL VEHICLE HOURS	17,450	28,298
AVERAGE TRIP LENGTH	11.56	12.14

HOME-BASED NON-WORK VEHICLE TRIPS

	1964	1985
TOTAL TRIPS	147,802	275,325
TOTAL VEHICLE HOURS	23,962	45,572
AVERAGE TRIP LENGTH	9.73	9.93

NON-HOME BASED VEHICLE TRIPS

	1964	1985
TOTAL TRIPS	84,326	130,350
TOTAL VEHICLE HOURS	14,854	22,723
AVERAGE TRIP LENGTH	10.57	10.46

TRUCK TRIPS

	1964	1985
TOTAL TRIPS	39,271	56,009
TOTAL VEHICLE HOURS	7,212	11,045
AVERAGE TRIP LENGTH	11.02	11.83

FIGURE 16:
COMPARISON OF 1964 SURVEY AND 1985 MODEL
TRIP LENGTH FREQUENCY DISTRIBUTIONS

anticipated in 1985, assuming that no additional facilities would be constructed. The second distribution of 1985 travel was based on a traffic assignment network that included freeway facilities and a bridge connecting East Grove and Lost Bridge Roads at the southern tip of Lake Decatur, as well as minor network changes. Trip interchanges resulting from this distribution were used to estimate traffic associated with several alternative 1985 street and highway systems. Traffic flows resulting from each of these distributions are described in greater detail in the following chapter of this report.

The comparison of survey (1964) trip length frequency distributions and forecasted (1985) trip length frequency distributions is displayed in Figure 16. Shapes of the distribution curves for 1964 and 1985 are generally similar, although the 1985 distribution is shifted to the right in three of the four cases. This indicates that the average trip length (in minutes) is slightly longer for 1985 travel.

The increase in average trip length is the result of the anticipated development of outlying areas. A large proportion of the population increase will be accommodated by the residential developments in areas of Pershing Road, west of Oakland Avenue, and south of Lake Decatur. These areas are expected to develop at a lower density than the older central area, further increasing the dispersion of trip origins and destinations in the study area. Commercial and industrial activities are not expected to shift to outlying areas to any appreciable degree. Although some neighborhood retail and service facilities will be developed to accommodate residential expansion in outlying areas, it is anticipated that the bulk of commercial and industrial activity will still be located in the central area.

Additional Studies

Although the principal part of 1985 travel forecasting was accomplished by direct application of trip generation and trip distribution models, three additional studies were necessary to complete the specification of 1985 travel patterns. Forecasting of future travel at a majority of the external stations was accomplished by means of a growth factor analysis. External stations corresponding to points at which the proposed Interstate Route 72 enters the area required a separate analysis, due to the attraction of travel not currently passing through the Decatur area. A special analysis also was made for the Oakley Reservoir recreation area.

The external station growth factor analysis was necessary since much of this travel is made by persons not residing in the region. Consequently, detailed socioeconomic data for the forecasting of this travel is not available for application of trip generation equations. Growth in travel at external stations was estimated to increase in proportion to the population growth at the outlying origin or destination.

Trip ends outside of the study area were coded by county of origin or destination within Illinois and by state beyond these limits. Thus, to compute the growth factor for a station, external station survey data were analyzed to determine the outlying areas served by the route passing through the station. Forecasted population growth in these outlying areas, as well as the relative proportion of trips to each area, determined the growth factor. Growth in travel was forecasted to exceed the population growth by a slight amount (10 percent) to reflect the fact that travel has been increasing at a greater rate than population in the past several years.

Growth factors were used in the traffic modeling process by multiplying the number of producted and attracted trips recorded in the 1964 travel surveys by the growth factor for the corresponding station. Vehicular traffic at the typical external station was forecasted to increase by approximately 60 to 80 percent over the forecast period.

Forecasting of travel growth at the external stations for Interstate Route 72 was based on two earlier studies made for this facility: *Central Illinois Expressway Location Report* and *A Plan for Highway Improvement in the Champaign-Decatur Corridor*. Review of these reports indicated that about 12,000 trips per day would be attracted to the freeway in 1985, in excess of vehicular travel anticipated for a non-freeway facility. The major portion of this additional travel would be destined to or originate in the Decatur area, although about 2,600 trips per day would be expected to pass through the area without stopping. Traffic volumes produced by attraction of travel to the freeway facility were represented by preparation of special growth factors for the two external stations.

The forecasting of travel oriented to the Oakley Reservoir recreation area also required a special analysis. Travel projections for this area were based on the reports *Oakley Reservoir Development Plan* and *Oakley Reservoir Planning Area, Phase 1*. Studies documented in these reports indicated that about 4,200 vehicle trips of a recreational nature would be attracted by the proposed facilities on a typical summer weekday in 1985. It was estimated that about half of these trips would be made by residents of Macon County and the other half by visitors from more remote locations. The travel of Macon County residents oriented to the area was simulated by a multiplier factor on trip interchanges between traffic zones within the Oakley Reservoir recreation area and all other traffic zones. Trips attracted from more remote locations were represented by the addition of trips between traffic zones in the recreation area and external stations. The number of trips added for each external station was based on the proportion of recreational travel expected from that direction of approach.

The application of trip generation equations and trip distribution models, supplemented by the special studies described above, formed the forecast of 1985 travel patterns. Forecasted volumes in the form of zone-to-zone trip interchanges were a major input for the testing of alternate systems by means of traffic assignment as described in the following chapter of this report.

TRANSPORTATION FACILITIES

CHAPTER 4

The regional transportation system in the Decatur urbanized area is made up of a variety of types of facilities. A large part of this system serves the movement and temporary storage of automobiles and trucks, through streets and highways and parking and truck terminal facilities. Public transit is essential to certain individuals who are unable to travel by automobile or taxi, due to age, infirmities, or financial restraints. A substantial portion of the intercity transport of persons and goods is served by commercial carriers.

The several types of transportation facilities were studied at various levels of detail. Intercity commercial carriers, discussed in the first section of this chapter, have been analyzed in general terms to identify the anticipated need for terminal and transfer facilities within the region. The second section describes a forecast of public transit use, prepared for the purpose of estimating the impact of the transit system on street and highway requirements.

The major emphasis of this study was on the planning of street and highway facilities. The third section of this chapter describes the planning process employed and discusses principal findings of each step in the process. An analysis of terminal facility needs associated with the forecast of vehicular travel is presented in the fourth section.

The inventories and forecasts prepared for transportation facilities are described in detail in Interim Reports 5 and 8. Terminal and transfer facilities studies are separately documented in Interim Report 9.

INTERCITY COMMERCIAL CARRIERS

The bulk of intercity passenger travel (over 85 percent, nationwide) is made via the privately owned auto. Expansion of the interstate highway system will tend to promote continued use of autos for the major portion of intercity travel. Commercial carriers are primarily important due to the special needs of certain travelers.

The most obvious need satisfied by commercial carriers is that of travelers who do not have an automobile available for their trip. Members of the armed services and students frequently fall into this category. Families with only one car often may be dependent on commercial carriers when the car is used by one member of the family.

Commercial carriers also may be preferred by a traveler who could, if he wished, make the trip by auto. Businessmen frequently prefer the speed or safety afforded by a commercial carrier.

The reputation of a region as a suitable convention center, or as the headquarters location for a business with widely separated offices or factories, is strongly dependent on the availability of airline services. Currently, three types of commercial transport are available to travelers in the Decatur urbanized area: airline, railway, and bus.

The inventory of intercity commercial carriers was accomplished by sending letters of inquiry to local officials for each of the major companies. Historical and current data on annual passenger and freight movements for air, rail, and intercity bus systems were requested for the period 1945 to 1965. In addition, schedules for passenger service were collected from each of the Decatur area terminals.

Air Service

Air travel is becoming increasingly important in the Decatur area, as it is in the nation as a whole. There is one airport in the area, the Decatur Airport. About half of the travelers using Decatur Airport facilities are passengers on privately operated aircraft. Ozark Airlines, which has offered commercial service to the area since 1950, was asked to supply annual statistics on revenue passengers and services provided.

At present, a feeder route to Chicago and St. Louis terminal areas is operated. Although the number of flights (an average of 10 per day) has not varied significantly since service was inaugurated, service has been upgraded by such equipment changes as the addition of F-27 aircraft in 1965 and DC-9 aircraft in 1967. Since 1950, commercial travel at Decatur Airport has shown an average annual increase of about 13 percent, similar to national trends. Continuing this trend, a tenfold increase in commercial travelers would be expected by 1985, for an average of 900 persons enplaned per day. This volume of traffic would warrant some type of regularly scheduled passenger transportation between the airport and the central area, such as limousine or bus service.

Rail Passenger Service

Railway passenger service to Decatur has declined steadily over the past several years. The Norfolk and Western Railway Company was the only line offering passenger service at the time of inventory. It operated four trains per day between St. Louis-Detroit and St. Louis-Chicago. No records were available to determine annual trends in ridership, but company officials reported that the number of trains had been decreased from

4,902 per year in the late 1940s to 2,920 trains per year in 1965. About 80 boardings per day were made in Decatur in 1965. Elimination of all railway passenger service to the City of Decatur is possible in the near future.

This is typical of national trends in railway passenger operations. Rail carriers foresee a potential market in densely populated corridors (e.g., the eastern seaboard) where they can carry passengers from city-center to city-center in a total elapsed time comparable to airlines, and may develop financially lucrative passenger operations in such areas. Service to outlying regional centers such as Decatur is generally eliminated, however, in the face of steadily decreasing patronage.

Intercity Bus Service

Decatur was served by five intercity bus companies at the time of the inventory. One or two round trips daily were scheduled between Decatur and Bloomington, Champaign, Chicago, Evansville, Indianapolis, Peoria, Springfield, St. Louis, and Terre Haute. Letters of inquiry were sent to the five companies (Illinois Highway Lines, Peoria-Rockford Bus Company, Continental Trailways, Crown Transit Lines, and DeLuxe Trailways) requesting information on annual revenue passengers, annual trips serving Decatur, and plans for service charges. No trend data specific to the Decatur area were available on intercity bus passenger volumes, but bus company officials responding to inquiries were pessimistic about the future of intercity bus operations.

Intercity Freight Carriers

Currently four types of intercity freight carriers are serving the Decatur urbanized area: railway, truck, pipeline, and airline services. Specific data on the volumes of shipments handled by each type of carrier in the area were not available, but railway and truck companies undoubtedly accounted for most, followed by pipelines and airlines, in that order.

At the time of inventory, five railway companies served the area: the Baltimore and Ohio, the Illinois Central, the Illinois Terminal, the Pennsylvania, and the Norfolk and Western. Officials of each company were requested to supply annual information on the trains serving Decatur, annual statistics on car loadings for Decatur area terminals, and a description of trailer-on-flatcar operations. Trends in car loadings and trains per day for rail carriers in the region remained relatively stable in the period 1950 through 1965. This is similar to national trends, but may be somewhat misleading due to increases in average car size, increased efficiency in packaging, and the fact that no response was received from two of the five carriers. The merger of railway companies may have some effect on terminal facilities in the region. The Wabash Railway Company has already been acquired by the Norfolk and Western Railway Company, and a merger of the Baltimore and Ohio and Norfolk and

Western Railway Companies is probable in the near future. This may lead to abandonment of duplicated trackage and consolidation of terminal and yard facilities.

National statistics on intercity freight transportation indicate that the trucking industry has grown rapidly during the past several years, in contrast to the comparatively static railway industry. This trend is expected to continue during the forecast period. There has been a substantial increase in the size of payloads for intercity truck freight, made possible by more efficient power units and increased trailer size. The trucking industry may be significantly affected by the growing use of double bottom (tractor, semi-trailer, and trailer) combination loads during the next several years. This combination makes a greater payload per driver and power unit possible, and also leads to fewer less-than-load shipments, enabling truckers to bypass break-bulk terminals.

Inter-modal systems are expected to become increasingly important in the near future, particularly railway-truck systems. This is already appearing with the growth of trailer-on-flat-car and container-on-flat-car operations. Inter-modal systems will cut into the long haul service presently provided by the trucking industry, but the growth in intra-regional business is expected to outweigh these losses. Although no railways in the Decatur area provided regular trailer-on-flat-car service at the time of inventory, this would be expected to become a significant operation during the forecast period.

The development of terminal facilities for a trailer-on-flat-car system affects street and highway system needs in several ways. The proportion of combination trucks as a part of total vehicular traffic would increase on-street and highway facilities serving the terminal. The resulting heavier loads may, in some instances, control the design of pavement for these streets and highways. The higher proportion of combination trucks also could lead to traffic congestion on streets and highways with little or no reserve capacity. Economic success of a trailer-on-flat-car terminal facility would require a high-level of services on these roadways.

No trend data specific to the Decatur area were available for either air freight or pipeline operations. Although a large increase in ton-miles of air freight is anticipated, it will still represent a minor part (less than one percent) of total intercity freight transfers, nationally. Pipelines are not a primary conveyance for commodities in the Decatur area, although the location of natural gas lines has been a determinant in the location of industrial sites. In addition to the natural gas pipeline and spurs, there are three refined products pipelines in the area with terminals near Harristown and Forsyth. One crude oil pipeline passes through the area, but provides no local service.

INTRACITY BUS TRANSPORTATION

Decatur City Lines, a subsidiary of National City Lines, provides the only intracity bus service in the study area. There were nine regularly scheduled routes in the urbanized area at the time of inventory. The boundary of the transit service area is roughly a circle of two-mile radius, centered in the central business district. All routes radiate outward from the central business district, so that crosstown trips must necessarily be made with a transfer. Weekday service is provided during the hours of 6:05 A.M. tó 6:30 P.M., during which all routes operate with headways of approximately 30 minutes, and no service is provided on Sundays or holidays. Transfers are possible in the downtown area only, but schedules make transfers between all routes convenient and reliable.

The bus company operated 14 rubber-tired, motor-powered buses at the time of the inventory. The capacity of each bus was 36 seats. There are no trolley or intracity rail facilities in Decatur.

Past and projected trends in annual revenue-passengers and seat-miles of service are shown graphically in Figure 17. Seat-miles of service provided by the transit company have understandably been reduced in the face of steadily decreasing demands for service. Decatur City Lines carried nearly 11,000,000 revenue passengers in 1945. Similar trends have occurred in many cities of small to intermediate size. Greatest losses in transit passengers occurred in the years immediately following World War II, concurrent with the greatest growth in auto ownership. During the last several years, patronage has continued to decline, but at a much lower rate than in the past. An increasing proportion of transit passengers consist of the aged, the poor, and the young; persons who do not have access to an auto or do not possess a driver's license.

As a part of the Transit Ridership Improvement Project Survey[1], factors influencing the modal choice of transit were investigated. Approximately 71 percent of peak-period passengers responded that no alternate means of transportation had been available to them. Theoretically, a taxi would be an alternate mode of transportation, but respondents probably felt that a taxi would be beyond their economic means. The foregoing percentages actually reflect the number of transit riders who had no auto or auto driver available at the time of their trip.

Persons who have no satisfactory alternate mode of transportation are called captive riders of the transit system. The high percentage of captive riders identified in the Transit Ridership Improvement Project Survey indicates that a large number of persons are dependent on buses for mobility and also indicates the inability of transit to compete with the auto as a mode of transportation in Decatur.

The Decatur urbanized area is characterized by a size and density of development which is unfavorable to a transit operation. It appears that

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[1] *Premium Special Bus Service, Interim Summary Report*, Bureau of Economic and Business Research, University of Illinois, Urbana, 1966.

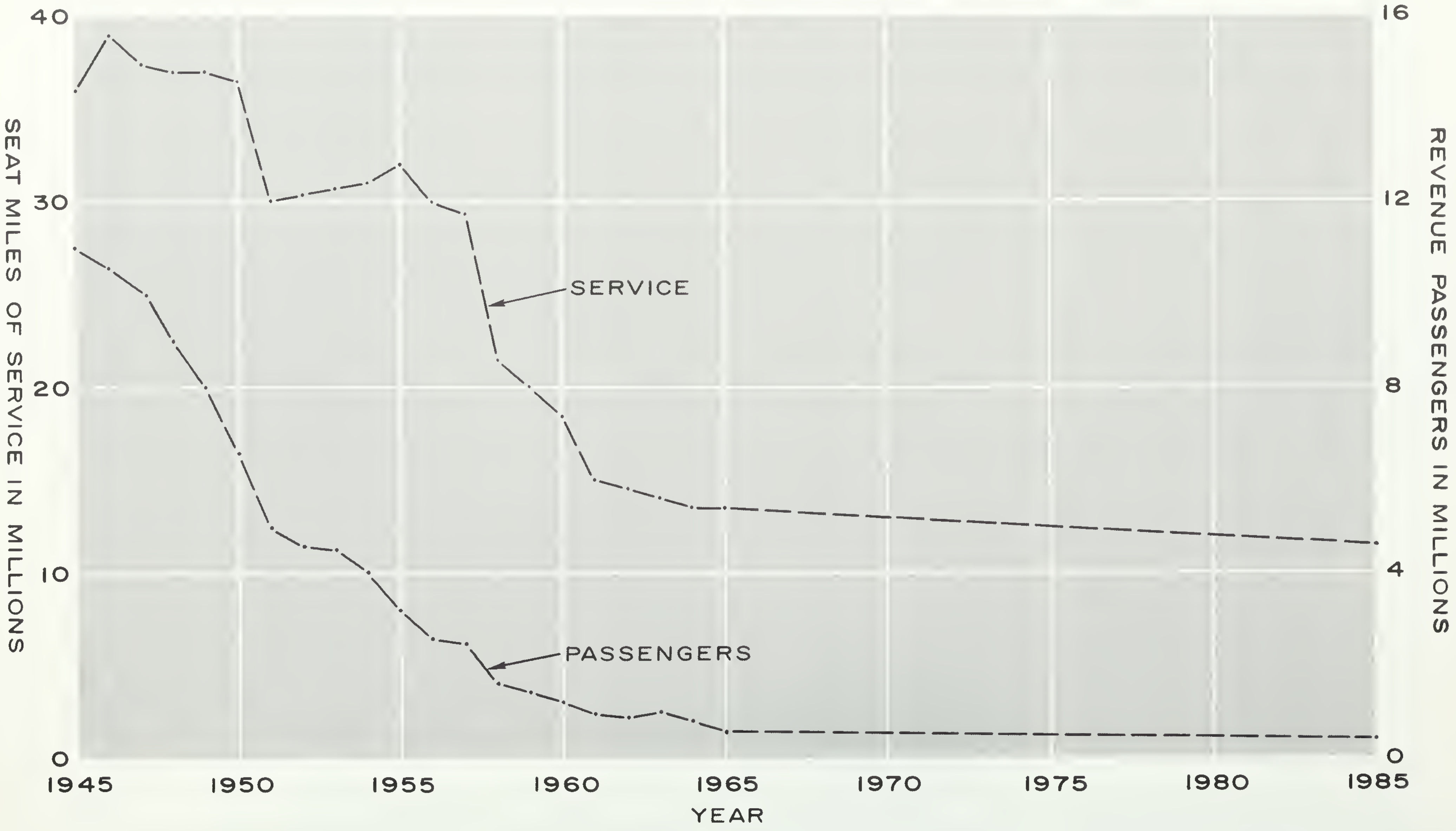


FIGURE 17:
PAST AND PROJECTED TREND IN TRANSIT RIDERSHIP AND SERVICE

transit cannot economically compete with the auto until congestion of central city streets and lack of parking in the central city exert significant pressures on the auto driver. In the Decatur area, these pressures are not anticipated during the forecast period. Unless transit operations are radically changed, future patronage most probably will be drawn from a steadily declining captive rider market.

FORECAST OF TRANSIT USE

As a step in the traffic modeling process (described in the preceding chapter), it was necessary to predict forecast year transit passenger volumes by traffic zone. Transit patronage is, of course, dependent upon the service provided by the transit system. Transit routes and the corresponding service area assumed for purposes of estimating forecast year passenger volumes are shown in Figure 18.

The land-use patterns anticipated in 1985 are somewhat different from those which existed in 1964. Changes include development of new residential, industrial, and commercial areas, and changes in the density of development in existing areas. These changes suggest certain modifications in transit system services, principally in the area of route extensions. Anticipated developments north of Pershing Road and south of Lake Decatur were tested as possible service areas, but forecasted income levels and density of development in these areas appeared to prohibit such service extensions. It was assumed that the level of service would be similar to that of the existing system, with operations limited to the midday period and 30-minute headways.

Application of transit passenger volume estimating equations with forecasted socioeconomic data and the assumed transit service area resulted in a forecast of 1,820 transit passengers on a typical weekday in 1985. The equivalent projection of annual revenue passengers is shown in Figure 17. The forecast seemed reasonable in the light of past trends and also represented a conservative estimate for the computation of auto-oriented travel.

The forecast of future transit ridership is not optimistic. Since it is based on essentially a slight modification of existing conditions including both system (buses operating at 30-minute headways, but covering a larger service area) and type of patronage (basically captive riders, or those not having satisfactory alternate modes available). These facts suggest that an improvement in the system might attract new riders.

Methods of Increasing Patronage

A primary aim of the Transit Ridership Improvement Project Survey was to evaluate effects of service improvement on transit patronage. Service improvements were designed to attract passengers, particularly people making trips for the purpose of work or shopping, who would be expected to respond to superior service. Personal contractual bus service and

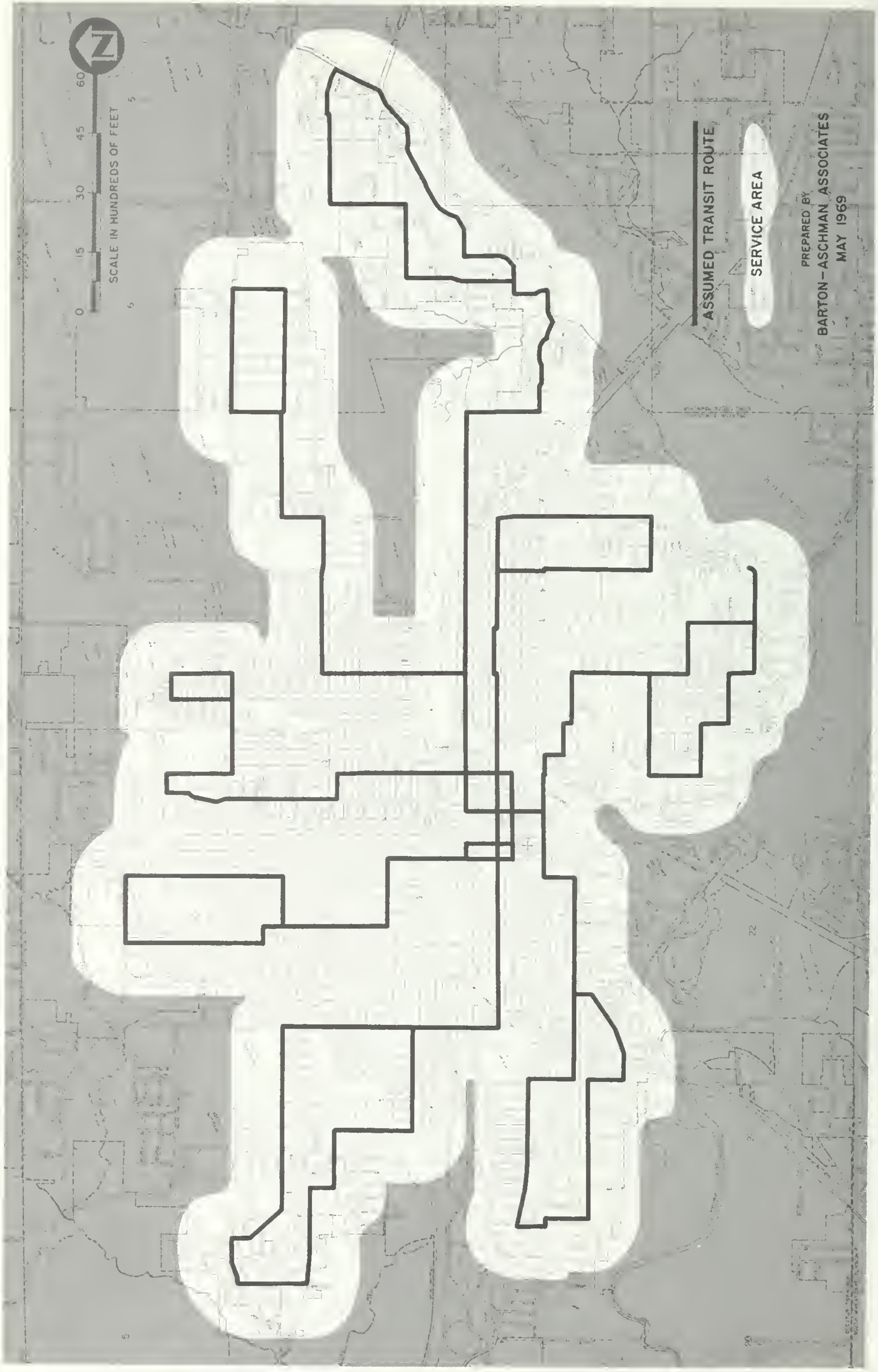


FIGURE 18:
ASSUMED 1985 TRANSIT SERVICE

express service to outlying areas were instituted on a trial basis. The project results indicated that superior service did not generate enough patronage to meet operating costs.

Some positive action on the part of local public officials or transit officials will be necessary to avoid further cutbacks or eventual termination of transit services. There are three general courses of action: first, to increase patronage without a prohibitive increase in operating costs; second, to lower transit system expenses through technical or administrative innovation; and third, to subsidize transit operations with public funds.

Increased patronage of the transit system might be encouraged by various advertising campaigns or promotional schemes, but long-term gains in patronage are dependent upon the provision of improved services. The cost of implementing a specific improvement must, of course, be compared with expected benefits in the form of increased profits. Since a major part of transit system expenses are related to labor costs for operation and maintenance of vehicles, service improvements that involve a more efficient use of personnel generally will produce the greatest return on investments on a long-term basis.

One means of substantially upgrading transit service is to use computers for scheduling. The routing of buses may be controlled to achieve optimum utilization of equipment and operators, based on short-term fluctuations in transit passenger volumes. "Dial-a-bus" systems represent an even more sophisticated form of scheduling in which passengers phone for trip service and routings are modified to provide portal-to-portal service for most riders. Computerized scheduling is, at present, in the research and development stage.

Fare structures might be modified to accommodate passengers better. Zone fares, variable with the distance of the trip made, already have been tested in a simple form in Decatur, with the downtown shuttle bus. Use of zone fares on a system-wide basis is dependent on the development of efficient techniques and equipment for fare collection. Fares also might be made variable by time of day to encourage the utilization of vehicles in non-peak periods.

A program for the replacement of rolling stock is essential to upgrading transit services. Smaller, more maneuverable vehicles could be used to increase running speeds to be more competitive with auto travel times. Comfortable and reliable vehicles are a key factor in maintaining a system that is attractive to potential riders.

Administration of transit operations by a public agency may sometimes be employed as a means of lowering overall system expenses. For example, in areas where two or more private companies are providing local service, coordination of the individual company operations by a public agency can ensure the compatibility of schedules and service areas in order to provide optimum service to the general public. Also, the duplication of terminal facilities may be avoided. Local transit service in Decatur is provided by a single company, and, therefore, any increased efficiencies would result principally from tax advantages to public administration. Savings possible in this respect generally represent a very small fraction of operating costs.

Federal Aid Grants

A public agency, such as the City of Decatur, is eligible for federal aid grants toward financing mass transportation improvement projects, in accordance with the Urban Mass Transportation Act of 1964. Private companies may be benefited through contractual arrangements with a public agency administering a federally aided project. The Urban Mass Transportation Administration controls this program in which federal aid up to two-thirds of net project costs may be granted for projects shown to be essential to a long-range program of improvements for a coordinated transit and highway system.

Several types of grants are available under the terms of the Urban Mass Transportation Act. Demonstration grants may be used to test new methods and ideas in mass transportation (the Transit Ridership Improvement Project Survey study described above was funded in this manner). Planning, engineering, and design of mass transportation improvement projects may be aided by technical study grants. Fellowships in the form of managerial training grants for post-graduate study are available to persons employed in managerial, technical, or other professional positions in the urban mass transportation field.

Capital grants may be used for the improvement of physical facilities, including replacement of rolling stock. One possible technique for providing assistance to private companies is acquisition of equipment by a public agency for subsequent leasing to the privately operated company at a token rate. This is a form of subsidy of transit operations, since the private company is relieved of debt charges and taxes on physical facilities. At the same time, the general public is benefited by the use of modern equipment and eligibility for federal aid assistance.

Operating Subsidies

Although capital assistance to private companies is a positive step toward maintenance of transit system services, this alone seldom provides a long-range solution to economic problems of transit operations, since a major part of the expenses are attributable to operating costs. There are not provisions for federal aid grants applicable to the payment of operating costs. Subsidy of private company operating costs must be undertaken by state or local agencies.

Subsidies are sometimes unavoidable for the continuation of transit services. Although payment of subsidies to a private company raises several problems, the alternatives of elimination of services or public acquisition and operation of the system may be even less desirable.

Fixed subsidies, in the form of pedetermined payments on a regular basis, are a reasonable means of enabling private companies to meet out-of-pocket expenses in excess of revenues over a short term. The amount of the subsidy normally will be predicated on a statement of operating costs and revenues for some period of time. A fixed subsidy seldom includes sufficient funds to contribute to bus replacement, terminal improvements, or service experiments, so the operator may be discouraged from making investments of this nature. Also, as labor costs rise and certain capital improvements become unavoidable, the subsidy amount must be renegotiated to assure the operator of a fair return on his investment.

Guaranteed subsidies, in the form of an operating ratio or guaranteed profit arrangement, assure the operator of a predetermined rate of return or gross profit. These arrangements are more conducive to improvements of the system than a fixed subsidy, since the operator is certain to receive a fair return on investments made toward improvement of transit services. Auditing and computation of subsidy amounts can be an administrative headache to the public agency providing the subsidy, however, and the certainty of a profit might adversely affect the performance of the operator. The use of public funds to provide capital assets or profit for a private company also might create an adverse public reaction.

Future Transit System

For the purpose of estimating future travel patterns, it was necessary to assume a future transit system, generally based on current plans and policies, as well as past trends in transit patronage. Based on the Transit Ridership Improvement Project Survey experience, the future system shown in Figure 18 seemed appropriate to the Decatur area. This system assumes that the local policy is to provide satisfactory service for necessity riders at a minimum deficit. To assume that a significantly improved system would be developed did not seem appropriate, since the Transit Ridership Improvement Project Survey experience indicated that radical system improvements would not generate sufficient patronage to meet operating costs. At present, it seems doubtful that either public or private agencies would be willing to risk substantial expenditures on transit system improvements in the face of anticipated operating deficits. Yet transit service is critically needed by a small but significant part of the population and warrants continued study of system improvement to meet the needs of area residents.

PLANNING STREET AND HIGHWAY FACILITIES

In the definition of regional transportation facilities, a distinction has been made between the arterial street and highway system and local roadways. The distinction is based on the primary use for which a facility is intended. Local streets and highways are those facilities primarily intended for access to abutting properties and ordinarily would carry low volumes of traffic at slow speeds. Local roadways are not significant with respect to vehicular volumes (zone-to-zone trip interchanges) estimated by traffic models and have not been included in the system planning process.

Inventory of Existing Facilities

A first step in the inventory of existing arterial street and highway system facilities was the functional classification of all roadways. Standard classifications defined by the Illinois Division of Highways were used, determined by the primary use made of each facility at the time of inventory.

Arterial system facilities were classified into one of four possible categories. Freeways are high-speed facilities with full control of access, intended for the movement of long-distance travel. Expressways are moderate to high-speed facilities with partial control of access and also are intended primarily for the movement of trips of appreciable length. Major streets and highways are facilities without control of access, but primarily intended for trips of fairly long distance. In some instances, service to abutting land-uses may be restricted along major facilities to ensure the efficient flow of traffic. Collector streets and highways collect and distribute traffic between major and local roadways. They are primarily intended for service to a neighborhood area. Functional classification of the 1964 Arterial Street and Highway System, representing facilities existing at the time of travel surveys, is shown graphically in Figures 19 and 20.

An inventory was made of the physical characteristics of all arterial system roadways. Street width, pavement type, right-of-way width, traffic control, and similar data describing the system were recorded on maps and inventory forms. Much of this data was recorded later on punched cards to facilitate summarization of survey findings and computation of theoretical traffic carrying capacity for all roadways.

Street and Highway Capacity

One of the most important phases of the transportation planning process is the development of a standard to measure the ability of the system to accommodate existing as well as future travel demands. The capacity of a street or highway is a measure of its ability to accommodate traffic. It is a function both of the physical features of the highway and the operational characteristics of the traffic using the highway. Capacity has been defined as the "maximum number of vehicles that can pass over a given section of a lane or a roadway in one direction (or in both directions for a two-lane or a three-lane highway) during a given time period under prevailing roadway and traffic conditions. It

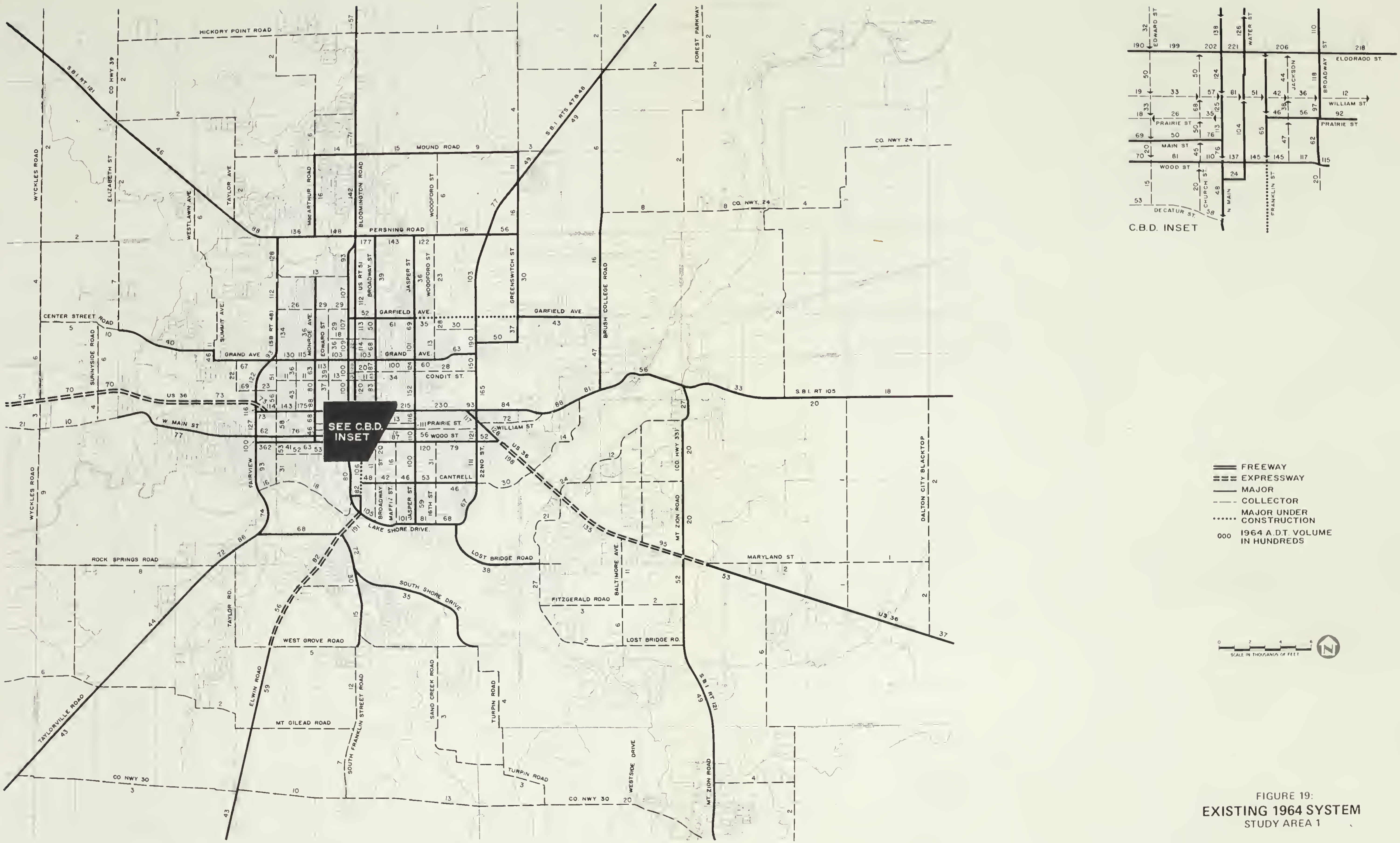
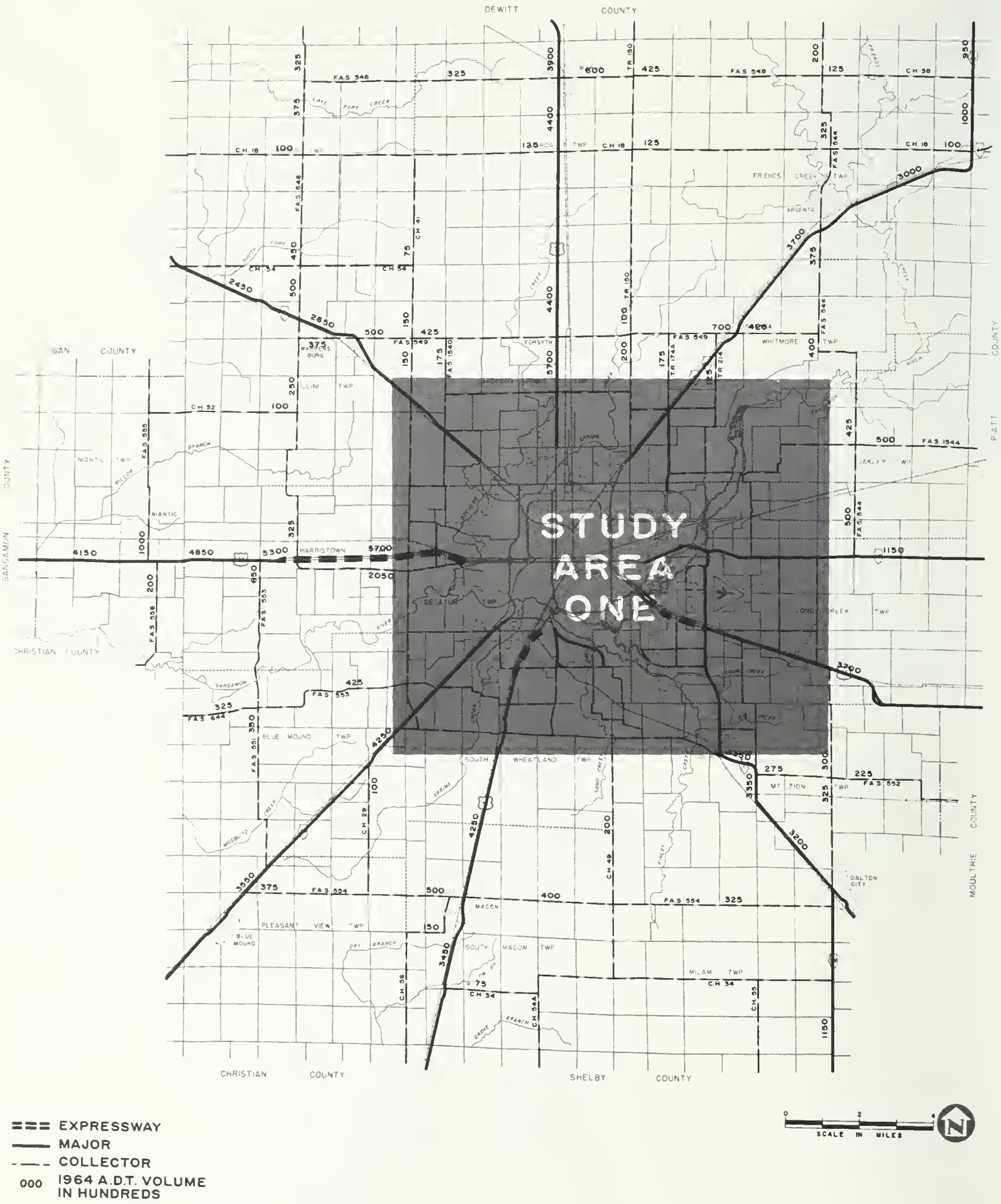


FIGURE 19:
EXISTING 1964 SYSTEM
STUDY AREA 1



=== EXPRESSWAY
—— MAJOR
-·—·- COLLECTOR
000 1964 A.D.T. VOLUME IN HUNDREDS

FIGURE 20:

EXISTING 1964 SYSTEM

STUDY AREA 2

is the maximum rate of flow that has a reasonable expectation of occurring."[2]

A recent concept introduced for the computation of traffic carrying ability of a roadway is *service volumes*, which represents a refinement of the earlier term, capacity. Service volume computations allow a particular level of service to be identified or specified. This concept reflects the degree of congestion or constraint on individual driver movements. By comparing traffic counts or estimated volumes with theoretical service volumes, the transportation planner is able to evaluate the operation of a roadway.

The computation of roadway capacity or service volume takes account of variations in traffic flow with the time of day. Most urban area residents are all too familiar with rush-hour traffic. The hours of the day in which a majority of persons are traveling between home and their place of work are known as the peak periods of travel. Basic computations for capacity or service volume involved rates of flow during these peak periods. Since traffic counts and forecasted volumes are generally expressed in terms of average daily traffic, appropriate factors were applied to estimate capacity and service volume in terms of vehicles per day. Thus, a roadway on which the average daily traffic volume equals 100 percent of the daily capacity would actually be loaded to capacity only during the peak periods of travel.

As part of the inventory of existing street and highway facilities, traffic counts were compared with theoretical daily capacities of corresponding roadways. Average daily traffic volumes (see Figures 19 and 20) were compiled for all street and highway sections by updating recent survey data or obtaining current counts. Theoretical capacities were computed by electronic data processing techniques, using punched card records of the physical inventory as basic input. Several roadways were carrying traffic volumes in excess of theoretical capacities. In many instances this theoretical deficiency was confirmed by the presence of congestion during peak periods of travel.

Accident Data

Efficiency of the existing system also was evaluated in terms of accident statistics. Intersections with the highest accident frequency are listed in Table 17. The relative safety of various roadways was compared by rating each street and highway section in terms of accidents per volume of traffic carried. Costs to the local economy incurred as a result of accidents were tabulated by type of roadway. As anticipated, expressways were significantly safer than major collector facilities in

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[2] *Traffic Engineering Handbook*, Institute of Traffic Engineers, Washington, D.C., 1965, p. 311.

Table 17
LOCATIONS HAVING 10 OR MORE ACCIDENTS
DURING TWO-YEAR PERIOD, 1963-1964

Location	Number of Accidents
Broadway Street and Eldorado Street	65
Jackson Street and William Street	43
Pershing Road and Water Street	39
Locust Street and 22nd Street	36
Eldorado Street and Monroe Street	36
Eldorado Street and Jasper Street	35
Eldorado Street and Van Dyke Street	29
Eldorado Street and Water Street	29
Jackson Street and Prairie Street	28
Eldorado Street and Edward Street	27
Eldorado Street and Main Street	26
Eldorado Street and Oakland Avenue	24
Broadway Street and Grand Avenue	22
Church Street and Eldorado Street	21
Broadway Street and Cerro Gordo Street	20
Grand Avenue and Main Street	20
Eldorado Street and 22nd Street	19
Eldorado Street and Jackson Street	19
Broadway Street and Garfield Avenue	18
Wood Street and 22nd Street	15
Prairie Street and 22nd Street	14
North Street and 22nd Street	13
Eldorado Street and Fairview Avenue	13
Eldorado Street and Franklin Street	13
Jackson Street and North Street	13
Jasper Street and Wood Street	13
Monroe Street and Prairie Street	13
Cerro Gordo Street and Water Street	12
Fairview Avenue and King Street	12
Garfield Avenue and Water Street	12
Grand Avenue and Water Street	12
Olive Street and 22nd Street	11
William Street and 22nd Street	11
Decatur Street and Franklin Street	11
Grand Avenue and Monroe Street	11
Jackson Street and Main Street	11
Main Street and Oakland Avenue	11
Geddes Avenue and 22nd Street	10
College Street and Prairie Street	10
Jasper Street and Lake Shore Drive	10
Jasper Street and Marietta Street	10
Jasper Street and Pershing Road	10

Source: Barton-Aschman Associates, compiled from spot maps supplied by the Illinois Division of Highways for Macon County and accident record forms supplied by the City of Decatur Police Department.

terms of accident costs related to traffic volumes, presumably due to the higher design standards employed for expressway facilities.

Evaluation of Future Systems

Inventory data compiled for the existing arterial roadway system provided a basis for the definition of possible future arterial systems. Comparisons of traffic counts and capacities and accident ratings indicated current problems, which should be corrected by proposed facilities. Physical inventory data, revised to reflect changes resulting from proposed improvements, were used to compute service volumes for facilities in the possible future systems.

The primary basis for evaluation of possible future systems was simulation of traffic volumes by traffic assignments. Four systems were analyzed by means of traffic assignments based on forecasted 1985 vehicular trip interchanges. Future deficiencies (assuming no additional expenditures on system improvements during the forecast period) were predicted by testing the Augmented 1964 Street and Highway System. Projects necessary for desirable levels of service were defined in the Recommended Street and Highway System. In view of financial deficiencies, a Minimum Recommended Street and Highway System was defined which included only those projects essential for minimum service to 1985 travel. Since even the projects essential for minimum service were estimated to be beyond the financial capacity of local agencies, a final test of the Attainable Street and Highway System was required.

Augmented Street and Highway System

The Augmented 1964 Street and Highway System included existing arterial facilities, projects under construction at present, and projects for which funds had been committed for construction in the near future. Representatives of participating agencies furnished descriptions of committed projects under their respective jurisdictions. Improvements to the existing system represented in the augmented system are graphically displayed in Figure 21. It may be noted that an extensive road building program was undertaken in the area during the course of the study.

Future trip interchanges were assigned to a network representing the Augmented 1964 Street and Highway System to predict problems resulting from the increased volumes, assuming that no additional funds are expanded for system improvement during the forecast period. It must be recognized that this is a highly improbable course of action, but deficiencies identified in the evaluation of this system were an aid to the selection of subsequent plan projects.

Deficiencies of the Augmented 1964 Street and Highway System are shown in Figure 22. Service volumes were computed for level of service C in the urbanized area, representing conditions of traffic flow in the peak period in which drivers are moderately restricted by other vehicles.

In the rural area, level of service B was used, representing conditions of traffic flow in which drivers are only slightly restricted by other vehicles. The demand volume for specific system facilities was estimated as the loading allocated to the corresponding network links by traffic assignment. The ratio of demand volume to service volume was computed as a measure of the adequacy or deficiency of each roadway section.

Three ranges of demand volume to service volume ratios are shown in Figure 22. The lowest range (1.01 to 1.20) identifies facilities on which some congestion would be expected during peak periods, but the facility would be operable at a lower level of service without any change in physical features. The middle range (1.21 to 1.80) identifies facilities overloaded to a moderate degree, so that the improvement of major intersections along the route by throat widening, channelization, signalization, or similar features would be required. The highest ratio (1.81 and over) identifies facilities for which additional lanes would be required over an appreciable portion of the route to serve demand volumes adequately.

Recommended Street and Highway System

The first future system defined was the Recommended Street and Highway System. In this phase of future system planning, the constraint of financial resources was treated as a secondary consideration to the definition of a system sufficient to serve forecasted travel at desirable levels of service and safety.

The Recommended Street and Highway System was defined in the following manner. The Augmented 1964 System (shown in Figure 21) constituted the basic framework for system planning to which possible street and highway improvements were recommended by the consultant and local agencies, subject to review by the Technical Committee. The selection of specific proposals to be included in the system was guided by a statement of general transportation system planning goals and objectives, a review of programs or plans for street and highway capital improvements previously established by the various agencies, and consideration of deficiencies noted in testing of the Augmented 1964 System.

General transportation planning goals and objectives were defined as follows:

1. *Coordinate All Transportation Planning in the Urbanized Area and Environs.* Coordinate efforts of local governments through association of local officials. Advise state and federal planning agencies of local plans and needs.

2. *Establish a Workable Continuing Planning Program.* Develop procedures for continuing studies and facilitating periodic review and revision of long-range plans.

3. *Identify and Plan for Long-range System Elements.* Evaluate the impact of proposed land-use developments on the long-range system.

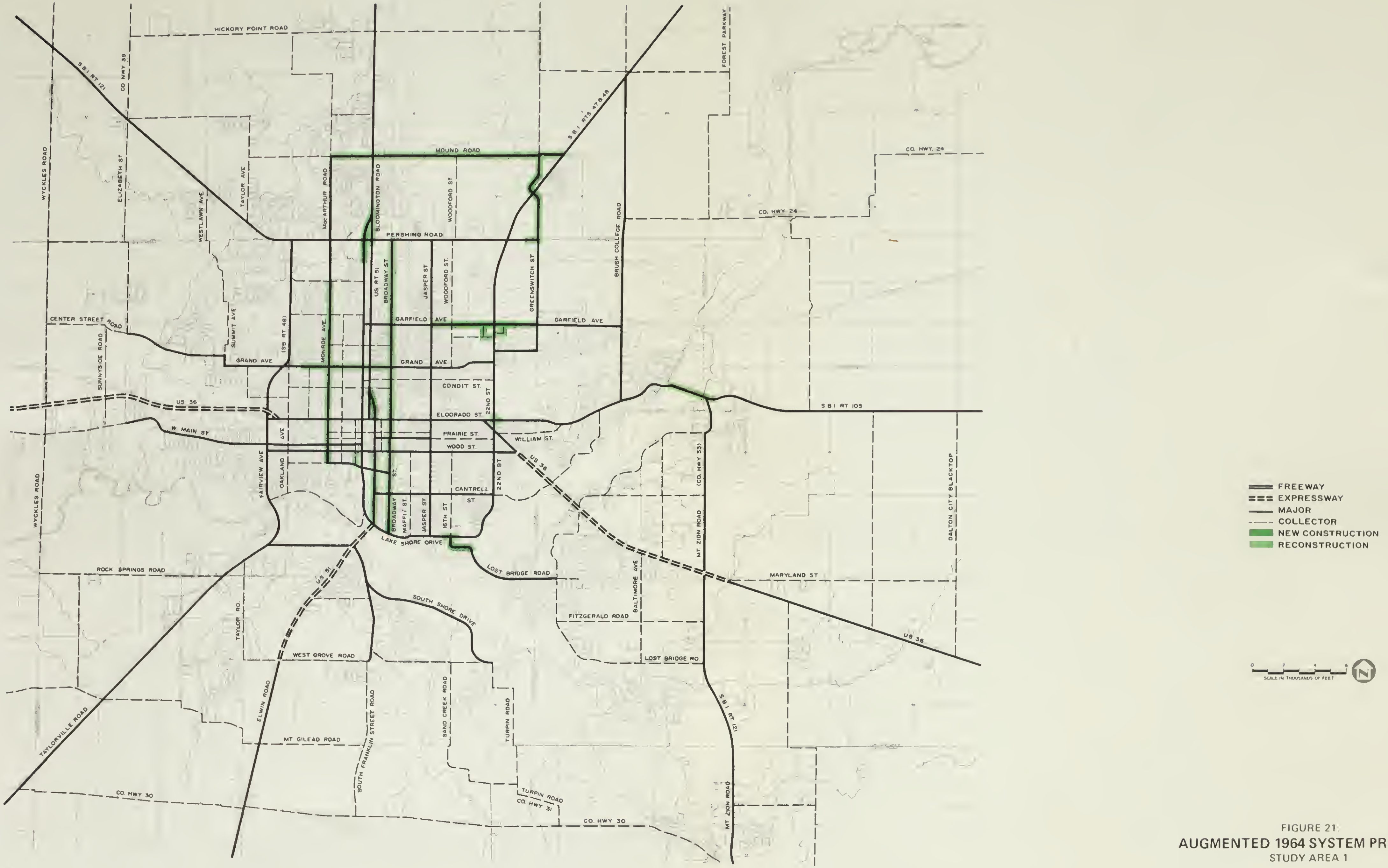

FIGURE 21
AUGMENTED 1964 SYSTEM PROJECTS
STUDY AREA 1

Encourage the reservation or protection of rights-of-way using the regulatory ordinances of local jurisdictions. Acquire long-range system rights-of-way well in advance of development of abutting properties.

4. *Concentrate Major Vehicular Movements on Uniformly Spaced Major Thoroughfares.* Provide reasonably direct routing for major vehicular movements. Place major thoroughfares at the boundaries of existing neighborhoods and areas of intense activity. Avoid penetration of neighborhood areas by vehicular traffic not destined to the area. Hold displacement and disruption of existing residential, employment, and tax base areas to a minimum.

5. *Designate a Major Thoroughfare System to Serve Areas of Probable Development in the Near Future, As Well As Developed Areas.* Select a system that may be extended to serve areas of anticipated development without disrupting the overall system. Minimize anticipated development by keeping abreast of plans for city and public service extensions and by maintaining liaison with public and private development groups.

6. *Develop a Long-range Program for Major System Improvements That Is Attainable with Regard to Expected Financial Resources.*

7. *Minimize Existing and Potential Traffic Hazards.* Study locations where accidents occur frequently and eliminate the contributing factors. Incorporate safety features in the design of proposed route improvements. Avoid abrupt changes in capacity or design speed along individual routes. Avoid complex intersections (more than four approaches, multiphase signals) as much as possible.

8. *Upgrade the Traffic Carrying Capacity of Facilities in Existing and Potential Areas of Traffic Congestion.* Improve the efficiency of existing facilities through changes in traffic operations or spot improvements of route design. Design future system elements to serve anticipated traffic volumes at desirable levels of service.

9. *Adapt Route Location and Design to Enhance, Rather Than Detract From, Abutting Land-uses.*

10. *Discourage Infringement of Abutting Land-uses on the Efficiency of Major Thoroughfares.* Where appropriate, use access control measures on major streets, as well as on expressway and freeway routes. Provide frontage roads for service of local traffic paralleling major thoroughfares.

11. *Minimize Pedestrian-vehicular Conflicts.* Provide for routing of vehicular trips around, rather than through, areas of intense pedestrian activity. Discourage or eliminate vehicular traffic in areas of intense pedestrian activity.

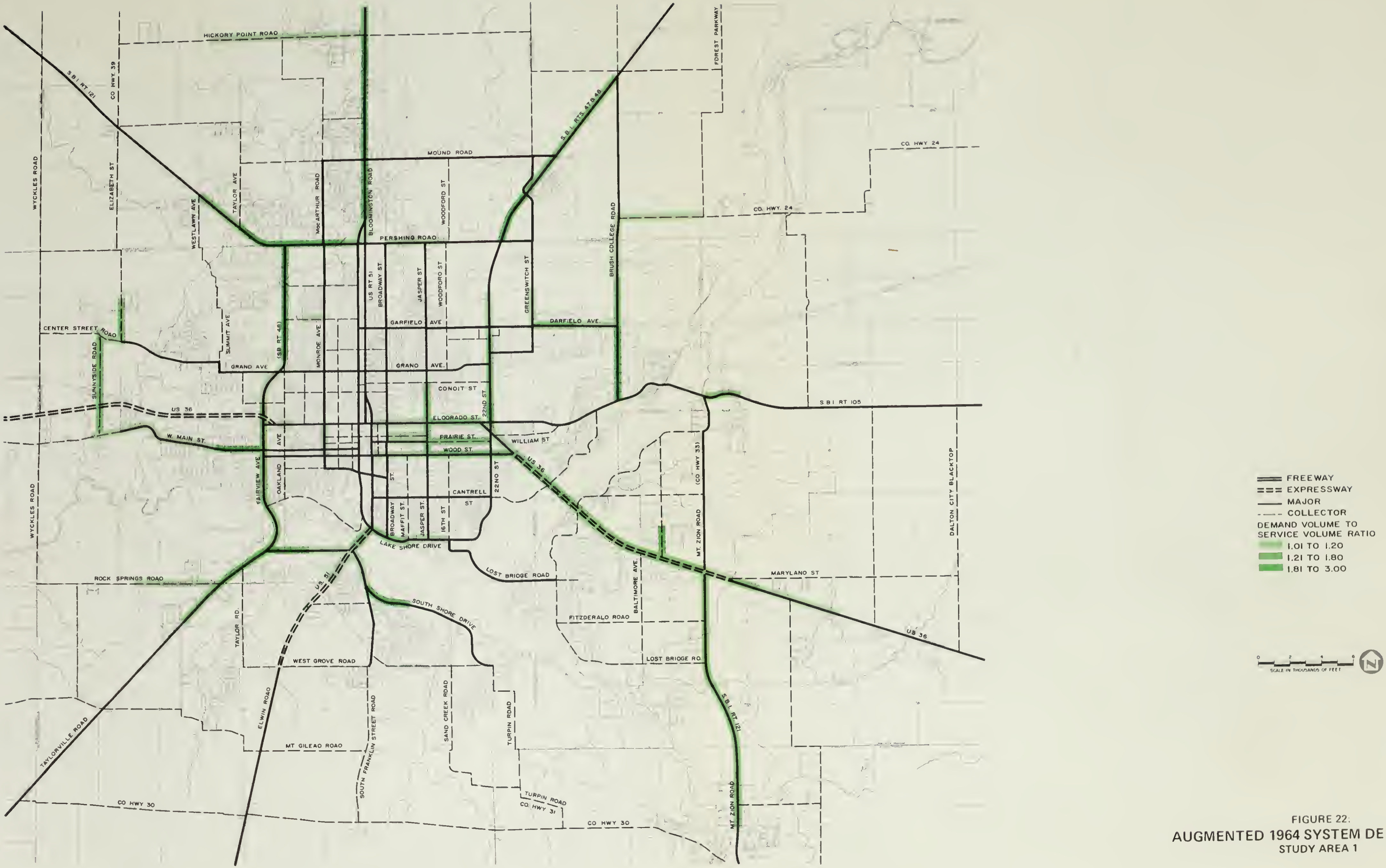

FIGURE 22:
AUGMENTED 1964 SYSTEM DEFICIENCIES
STUDY AREA 1

12. *Maintain an Adequate Mass Transit System.* Provide at least basic mass transit services for the benefit of persons who are totally dependent upon mass transit for mobility.

13. *Provide Rail, Air, and Intercity Bus Terminals Consistent with Anticipated Needs.* Treat terminals as focal points in the transportation system, providing convenient access for potential users by as many modes as possible.

Similar goals and objectives for regional development and provision of community services other than transportation facilities are implied by the statements of issues and policies presented in Chapter 1. Projected land-use patterns and the allocation of forecasted growth in population and employment to study area zones were predicated on the assumption that urban growth would be guided by stated policies. Planning for a transportation system to serve this forecasted urban growth is dependent on the forecasted land-use patterns occurring as projected.

Projects selected for the Recommended System, defined for testing by traffic assignment, are shown in Figures 23 and 24. Three route additions would be expected to have major impact on study area travel patterns. The Champaign-Decatur-Springfield Freeway (recently designated Interstate Route 72) traverses the study area from east to west. A second freeway route paralleling existing U.S. Route 51 (designated Supplemental Freeway Route F-12), traverses the study area from north to south. A major arterial route along the alignment of Grove Road, south of Lake Decatur, was proposed to facilitate movements between the freeways and U.S. Route 36 east of Decatur. These routes would enable motorists not destined to the Decatur urbanized area to bypass slow-moving central area streets, serve numerous long-distance trips by residents of the area, and also relieve some congestion on heavily traveled central area streets.

The designation of the Champaign-Decatur-Springfield Freeway as an Interstate Route (I-72) constituted a major step toward the attainment of the explicitly stated goal of a freeway connection to the nationwide interstate system. Local officials have long regarded this linkage as essential to the long-range economic growth of the region. Since the designation of I-72, the Illinois Division of Highways has initiated detailed location studies for freeway alignment and interchanges with arterial roadways in the Decatur area.

Freeway alignments and interchange locations shown in Figures 23 and 24 are approximate. For definition of the Recommended System, the most recent planning information available to the Illinois Division of Highways was used to select assumed configurations for each of the freeways. Preliminary studies[3] for I-72 had defined the location of this

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[3] *A Plan for Highway Improvement Within the Champaign-Decatur Corridor*, H.W. Lockner and Company. Chicago, 1959.

Central Illinois Expressway Location Report, Consoer, Townsend and Associates. Chicago, 1966.

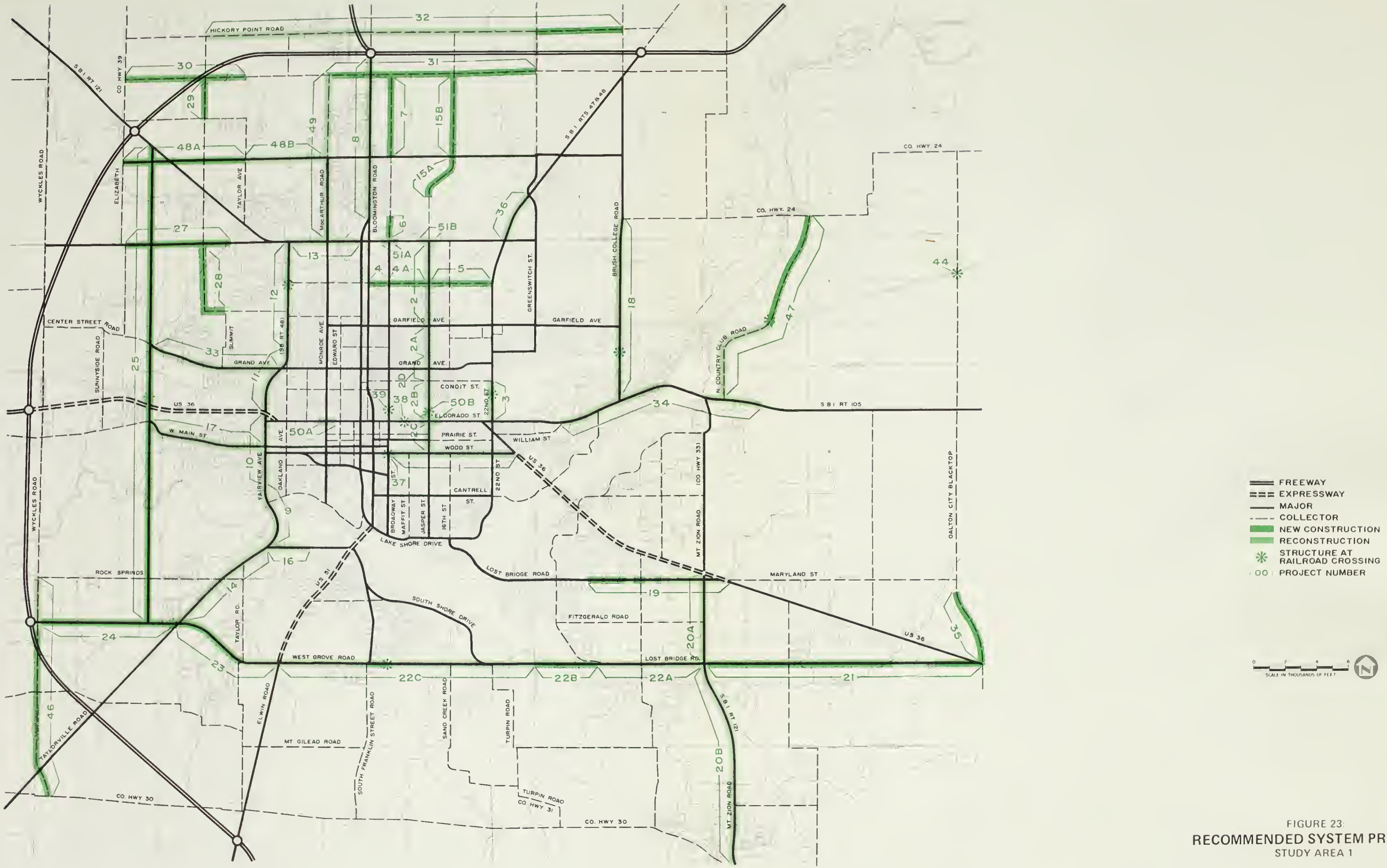

FIGURE 23:
RECOMMENDED SYSTEM PROJECTS
STUDY AREA 1

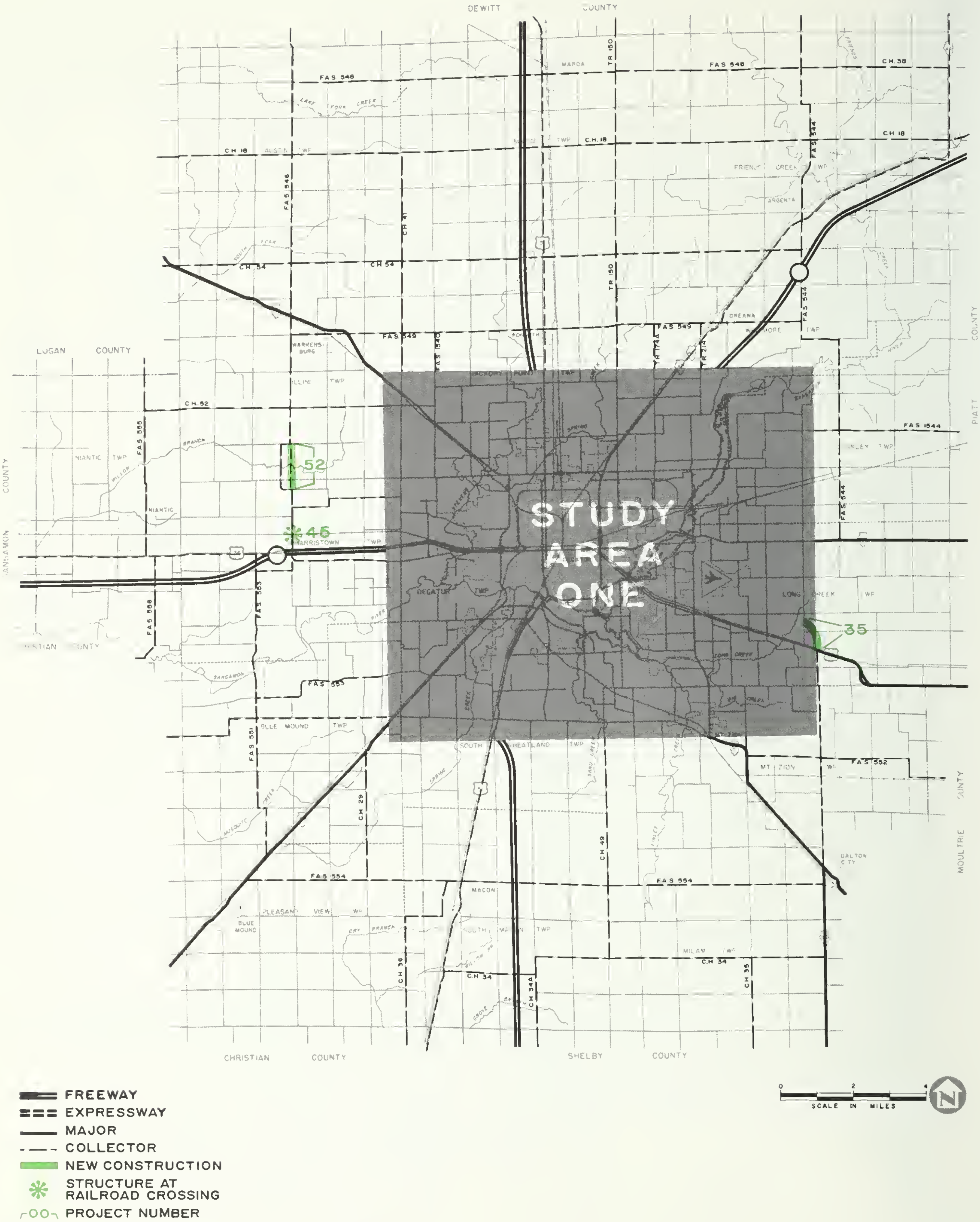

FIGURE 24:

RECOMMENDED SYSTEM PROJECTS

STUDY AREA 2

route within a fairly narrow corridor. The alignment for F-12 had not been so precisely defined, however, with initial planning studies considering two corridors each east and west of the urbanized area. Final alignment and interchange locations for each of the freeways will be determined by means of detailed location studies.

Several system improvements were suggested to provide for more direct routing of traffic. For example, a cross-over connection was proposed between Woodford and Jasper Streets north of Pershing Road, a major north-south route was proposed just east of Elizabeth Street, and a continuous east-west route was proposed along the alignment of Grove and Lost Bridge Roads. The Augmented 1964 System street pattern forces traffic in these corridors to follow indirect routes with numerous turns. The Woodford-Jasper route, for instance, would require a part of the trip to be made on an east-west route such as Pershing Road or Grand Avenue. Several jogs are necessary to make a north-south trip in the Elizabeth Street corridor, and east-west movements in the Grove Road corridor involve substantial adverse travel distances. Development of continuous major facilities in each of these corridors will be particularly important as suburban development places increasingly heavy burdens on the existing street system. Following development of outlying areas, provision of continuous major facilities at desirable spacings may involve costly acquisitions of improved properties.

Several grade separations of railroad-highway crossings are indicated in Figures 23 and 24. Standard Illinois Division of Highways warrants, based on the number of conflicts between trains and highway vehicles estimated for a typical weekday in 1985, were used to determine the need for grade separations. The provision of grade separations at critical crossings is essential to the attainment of desired levels of safety, as well as to the improvement of traffic carrying capacity of the street and highway system.

Numerous projects shown in Figures 23 and 24 involve the widening of existing facilities. One of the objectives stated for planning of the future system was that all facilities should possess sufficient traffic carrying capacity to serve forecasted travel demands at a level of service C in the urbanized area and level of service B in the rural area. The analysis of Augmented 1964 System deficiencies had indicated that a large part of the central area street and highway system would be overloaded in comparison to these standards, unless extensive widening of existing facilities was undertaken. Some relief of existing facilities would, however, be provided by newly constructed facilities.

The numbering of projects indicated in Figures 23 and 24 was defined for listing specifications and cost estimates by project. These data are presented in Appendix Table 1. For preliminary cost estimating purposes, it was assumed that all projects essential to the Recommended System would be built with standard cross sections adopted by the Illinois Division of Highways, for planning purposes, in 1965 (see Appendix Figure 9).

Standard cross sections will not necessarily be used in actual construction, due to a desire for higher standards in accordance with safety considerations and other factors.

Traffic assigned to a network simulating the Recommended System was used to estimate future demand volumes anticipated on each element of the system so that the need for route widening could be precisely determined. Widening projects shown in Figures 23 and 24 are necessary to provide desired levels of service throughout the system in view of demands predicted for a typical weekday in 1985, as shown in Figures 25 and 26.

The need for widening of existing streets and highways was determined by comparison of 1985 demand volumes (estimated by traffic models) and service volumes computed for existing roadways. In the central area, this comparison was made on a traffic corridor basis, so that reserve capacity on nearby parallel streets could be considered as the first form of relief to overloaded facilities. For corridors in which demand volumes exceeded service volumes, sufficient improvements were specified (in the form of construction of new facilities or widening of existing facilities) to raise the traffic carrying capacity of the corridor for adequate service of demand volumes. In this manner, the projects necessary to the Recommended System (displayed in Figures 23 and 24) were defined.

Selected projects represent only one of several possible means of attaining required system capacity in most instances. Projects included in previously established capital improvements programs generally were selected over other alternatives, especially where plan preparation or right-of-way acquisition had been initiated. The recommended improvement of the Eldorado-Wood corridor is an exception to this general rule, however.

In an earlier study, the development of Eldorado and North Streets as a one-way couple had been suggested. The improvement recommended in this current study is that Eldorado be operated as a two-way facility, and that Wood Street be substantially upgraded to develop necessary traffic carrying capacity in the corridor. North Street would not be designated as an arterial street in this latter solution to the corridor problem.

The Eldorado-North one-way couple was evaluated and considered a less satisfactory solution to the corridor problem for a number of reasons. First, the designation of North Street as an arterial route would have an adverse effect on existing residential areas east and west of the central business district. Second, diversion of traffic from Eldorado to North Street within the central business district would create additional pedestrian-vehicular conflicts, whereas, with Eldorado and Wood Streets as major routes in the corridor, principal vehicular movements would be channeled to the fringes of the core area. Third, termination of the Eldorado-North one-way couple would present a particularly difficult

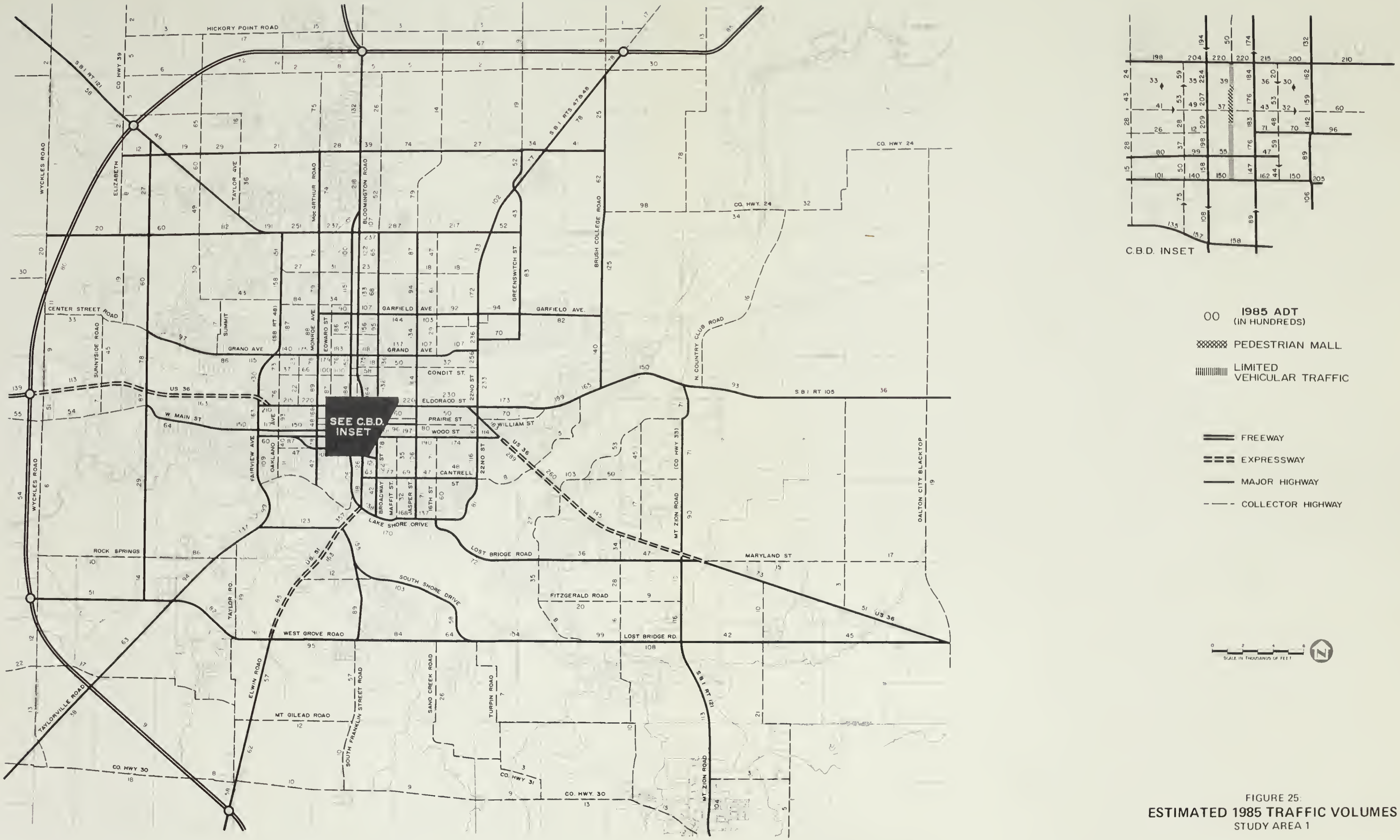

FIGURE 25:
ESTIMATED 1985 TRAFFIC VOLUMES
STUDY AREA 1

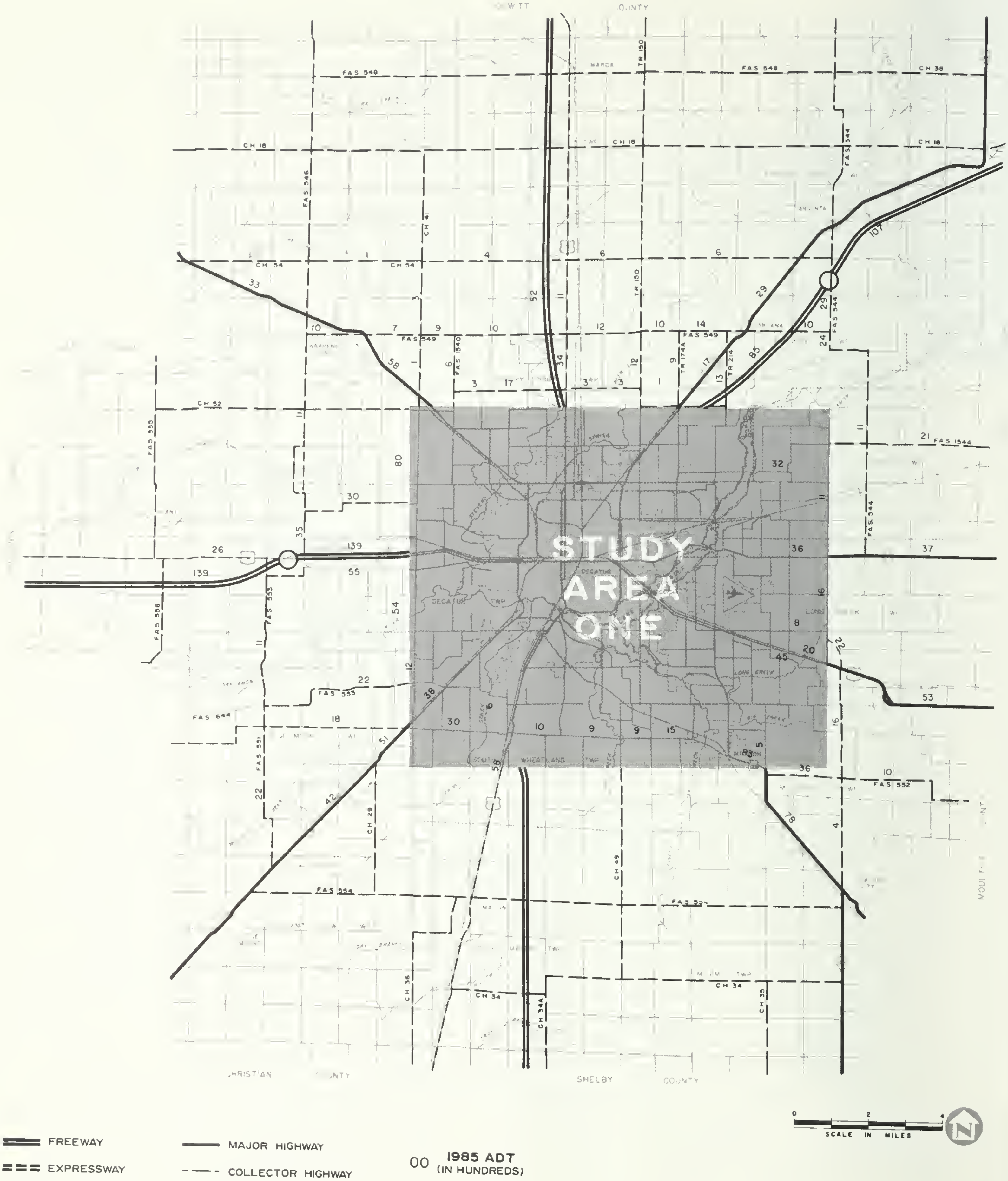

FIGURE 26:

ESTIMATED 1985 TRAFFIC VOLUMES

STUDY AREA 2

design problem at the eastern end of the couple. Upgrading of Wood Street and/or Main Street was selected as a more desirable solution to the corridor problem.

Following selection of projects for the Recommended System, preliminary cost estimates were prepared to evaluate the financial feasibility of the system. It was estimated that the program of capital improvements required would cost about $46,400,000 (in 1964 dollars). This amount exceeds projected resources for arterial system capital improvements ($20,800,000). Consequently, it was necessary to reevaluate the initial standards in order to define a less costly, but acceptable, street and highway system.

Freeway facilities were not included in the evaluation of financial feasibility. It was assumed that the financing of freeways would be accomplished with funds other than the resources projected for the participating agencies. I-72 would be financed by interstate highway funds, for which a 10 percent state highway department contribution would be matched by 90 percent in federal aid. F-12 would be financed through special funds established for the supplementary freeway system by the Illinois Legislature. Although freeways were not considered in financial aspects of future system development, future demand volumes were predicated on a system including freeway facilities.

Minimum Recommended System

The second phase in future system planning was definition of a Minimum Recommended System. This involved a cut-back of the Recommended System, in view of financial constraints on the construction program. Less desirable but acceptable levels of service and safety were accepted in numerous areas in order to reduce construction program costs.

The minimum Recommended System is shown in Figures 27 and 28. A major difference between the Recommended System projects (shown in Figures 23 and 24) and Minimum Recommended System projects is the deletion of several railroad-highway grade separation projects. In general, these projects were dropped except where new construction or appreciable widening was recommended for the corresponding street or highway. The Broadway Street crossing of the Norfolk and Western Railway tracks was retained in the program, however, due to the excessive number of railway-highway conflicts associated with switchyard operations in the vicinity of Broadway Street. At-grade crossings may be tolerated at the locations for which grade separation projects were originally planned, although a sacrifice of desired system levels of service and safety is involved.

Numerous projects desired to provide system continuity but not essential to the service of forecasted volumes were not included in the Minimum Recommended System. Examples of this are cross-over connections between Jasper and Woodford Streets and between sections of Dalton City Blacktop Road north and south of U.S. 36, as well as the frontage road system paralleling I-72 north of the urbanized area. Although travel in these areas would be facilitated by Recommended System projects, the projects are not essential in terms of traffic carrying capacity.

A less stringent level of service was accepted at some locations to further reduce the scope of the capital improvements program. The widening of Jasper Street north of Grand Avenue, extension of McKinley Avenue, and extension of Broadway Street were dropped from the program on this basis. Consequently, levels of service D to E would be anticipated during peak travel periods along the corresponding sections of the Bloomington Road, Pershing Road, and Jasper-22nd Street corridors.

At the eastern fringe of the urbanized area, traffic assignment results indicated a need for a major north-south facility and a westerly extension of Pershing Road. It was the opinion of the Technical Committee that the rate of development in this area has been overestimated at the time future development forecasts were prepared. In view of the unexpectedly slow rate of development in this area, the projects for provision of a major north-south facility and extension of Pershing Road were dropped from the program.

Following the definition of projects essential to the Minimum Recommended Street and Highway System, a revised summary of project costs was prepared. Jurisdiction for specific projects was determined by consensus of representatives of the participating agencies. Estimated project costs were then compared with financial resources of the agency responsible for funding of the projects.

A summary of the comparison of costs and resources by jurisdiction is listed in Table 18. Total costs for Minimum Recommended System projects were estimated to exceed projected resources by about $14,000,000. Thus, a further cutback of projects was necessary for development of a program of improvements within the financial capability of participating agencies.

Table 18
PROJECT COSTS AND FINANCIAL RESOURCES BY JURISDICTION

Jurisdiction	Resources 1970-1985	Minimum Recommended System Projects		Attainable Program Projects	
		Number	Sum of Costs	Number	Sum of Costs
State	$14,064,576	19	$24,466,000	12	$11,444,000(2)
County	4,000,000	7	3,652,000	5	2,458,000(3)
City	2,731,706	10	5,844,000	3	2,744,000
Total:	$20,796,282	33(1)	$33,962,000	20	$16,646,000

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(1) Three joint projects account for discrepancy between sum of projects by jurisdiction and total number of projects.

(2) Inclusion of next project would cause resources to be exceeded by about five percent.

(3) Two joint projects are beyond financial capability of city; corresponding county share not expended.

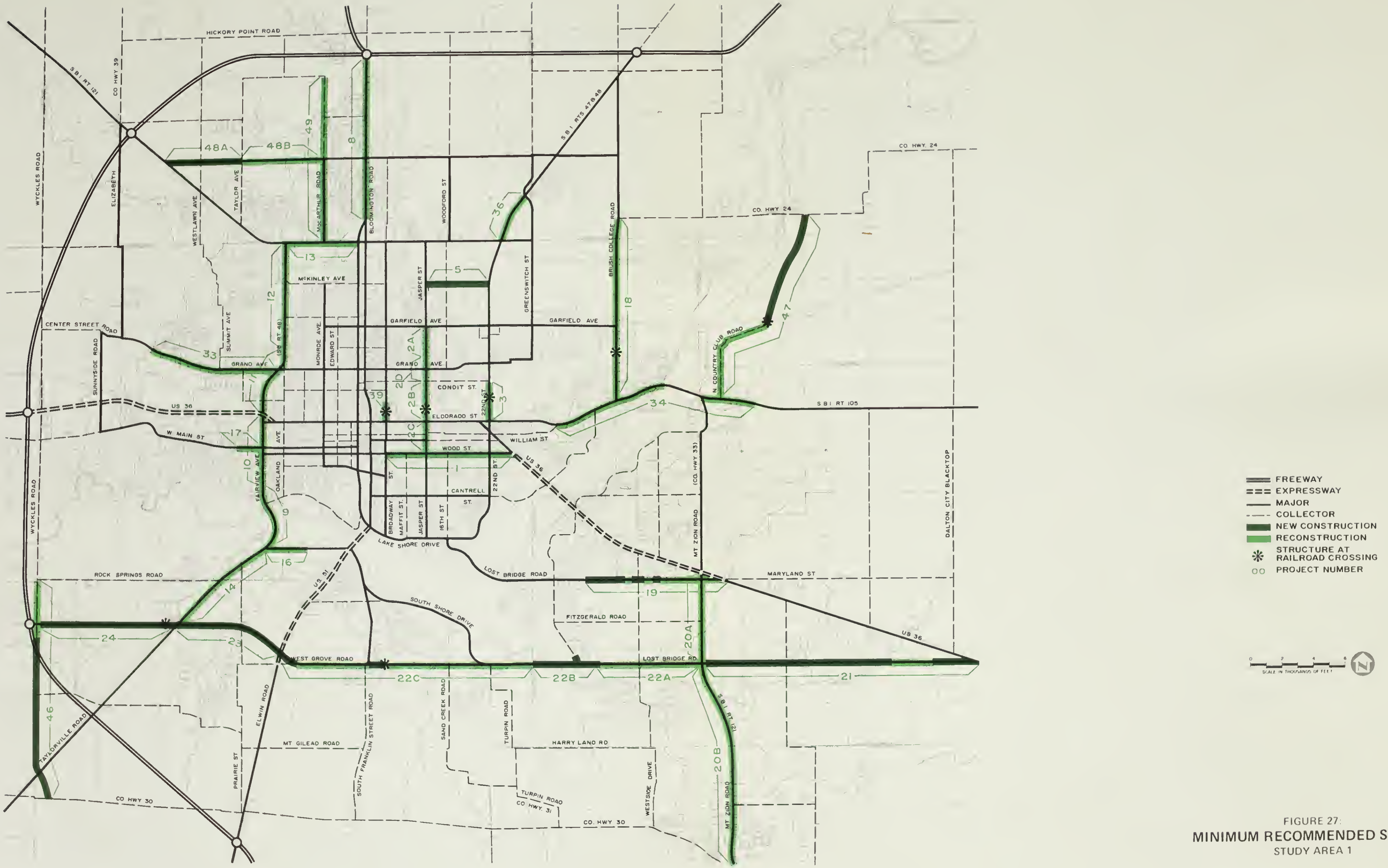

FIGURE 27:
MINIMUM RECOMMENDED SYSTEM
STUDY AREA 1

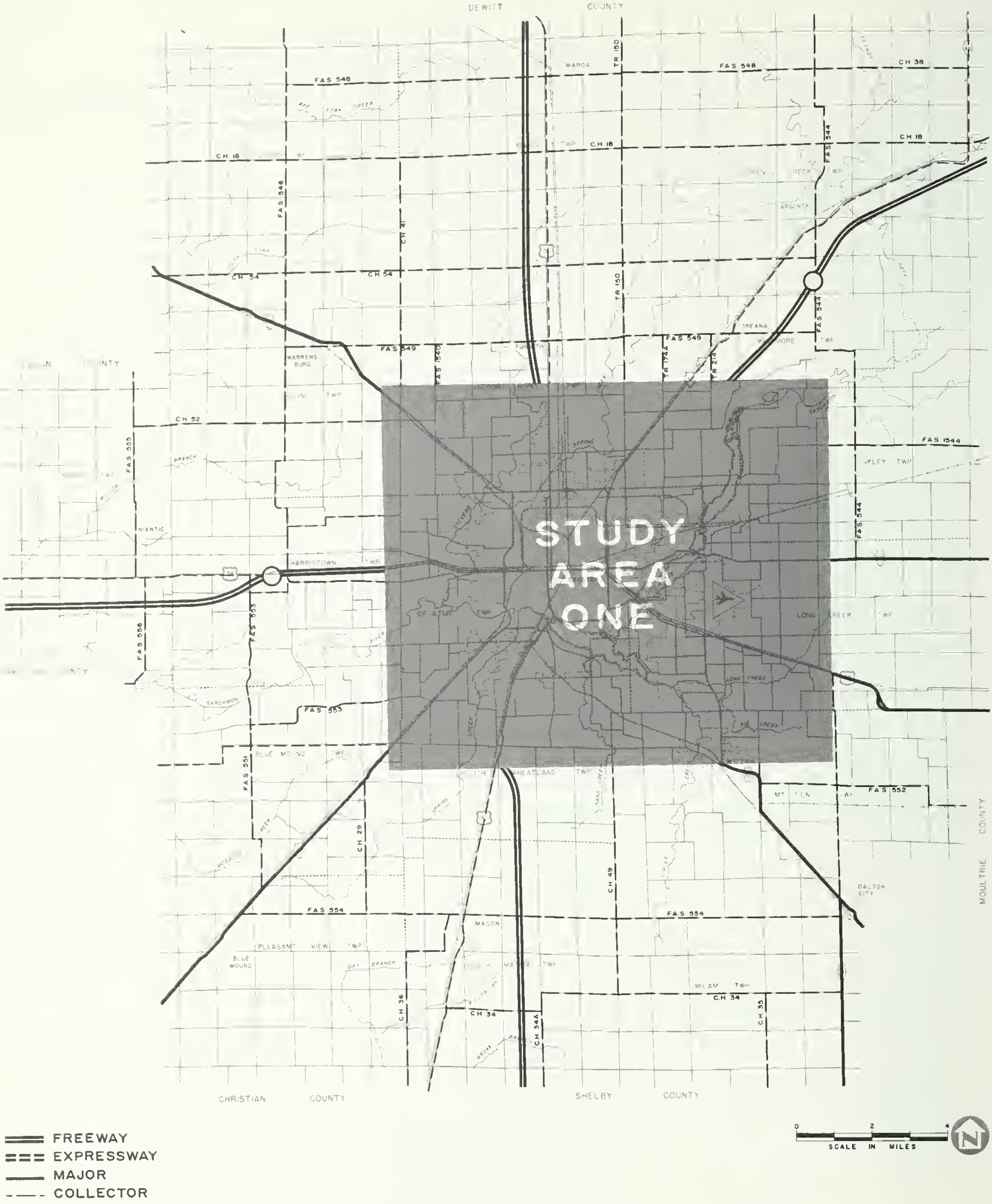

FIGURE 28:

MINIMUM RECOMMENDED SYSTEM

STUDY AREA 2

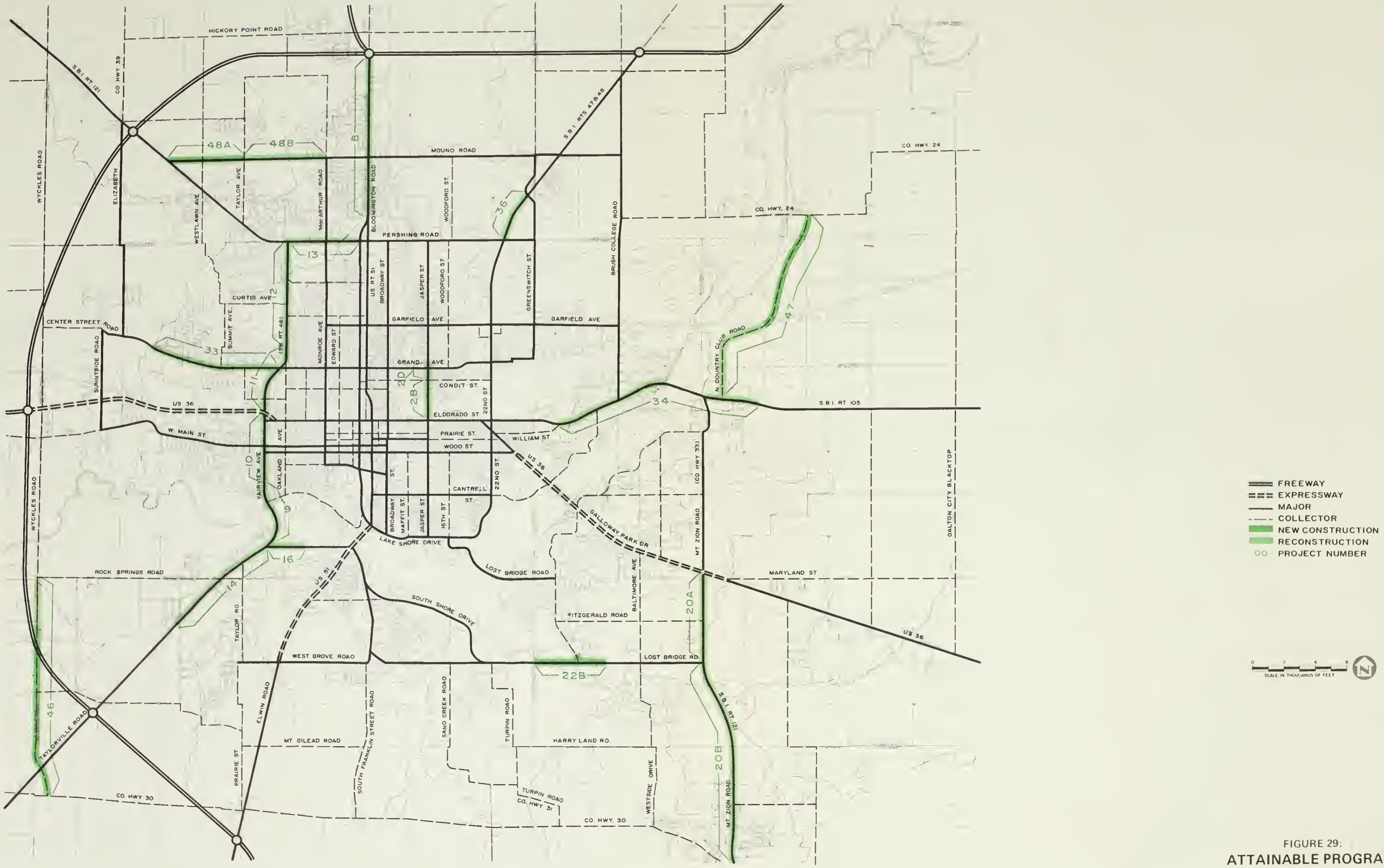

FIGURE 29:
ATTAINABLE PROGRAM

Attainable Street and Highway System

In the third and final phase of future system planning, the forecast year operation of a system within the financial capabilities of participating agencies (the Attainable Street and Highway System) was tested by traffic assignment. The purpose of this test was to evaluate future system deficiencies associated with a construction program limited by financial constraints.

Projects included in the Attainable Program are shown in Figure 29. These projects were selected by the assignment of priorities to projects defined for the Minimum Recommended Street and Highway System. Representatives of the participating agencies determined priorities for the several projects within their particular jurisdictions. Estimated project costs were then accumulated in order of assigned priority until inclusion of a subsequent project would exceed financial resources estimated for the agency. As noted in Table 18, 20 of the 33 minimum recommended projects were found to be within the financial capabilities of participating agencies.

Physical characteristics of the Attainable Street and Highway System are shown in Figures 30 and 31. Freeway facilities shown are, of course, only generally indicative of the ultimate alignments to be determined by detailed route location studies. Major and collector roadways have been stratified into three general categories. Routes designated as two-lane facilities generally include sufficient additional width for the provision of parking lanes on non-rural roadways. The four-lane facilities frequently include throat widening and channelization necessary for accommodation of turning movements at critical intersections. For a number of streets in the central area which are too narrow to allow the marking of four traffic lanes, paint stripe channelization was recommended at major intersections. This involves marking of an exclusive left-turn lane on each approach for a total of three traffic lanes at the intersection.

The operation of the Attainable Street and Highway System under forecast year (1985) traffic conditions is shown in Figure 32. As discussed for the analysis of Augmented 1964 Street and Highway System deficiencies, service volumes were computed for level of service C in urban areas and B in rural areas, and the ratio of demand volume to service volume was employed as a measure of the operation of specific facilities. Facilities marked for a ratio of 1.01 to 1.20 would serve forecasted traffic volumes, although a moderate degree of congestion would be expected during peak periods. The next range of ratios, 1.21 to 1.80, indicates that the facility would be severely congested during peak periods, but only moderately congested during midday hours. Facilities marked for a ratio of 1.80 or more would be expected to have severe congestion during much of the midday period, resulting in backups of traffic and prohibitive delays to motorists.

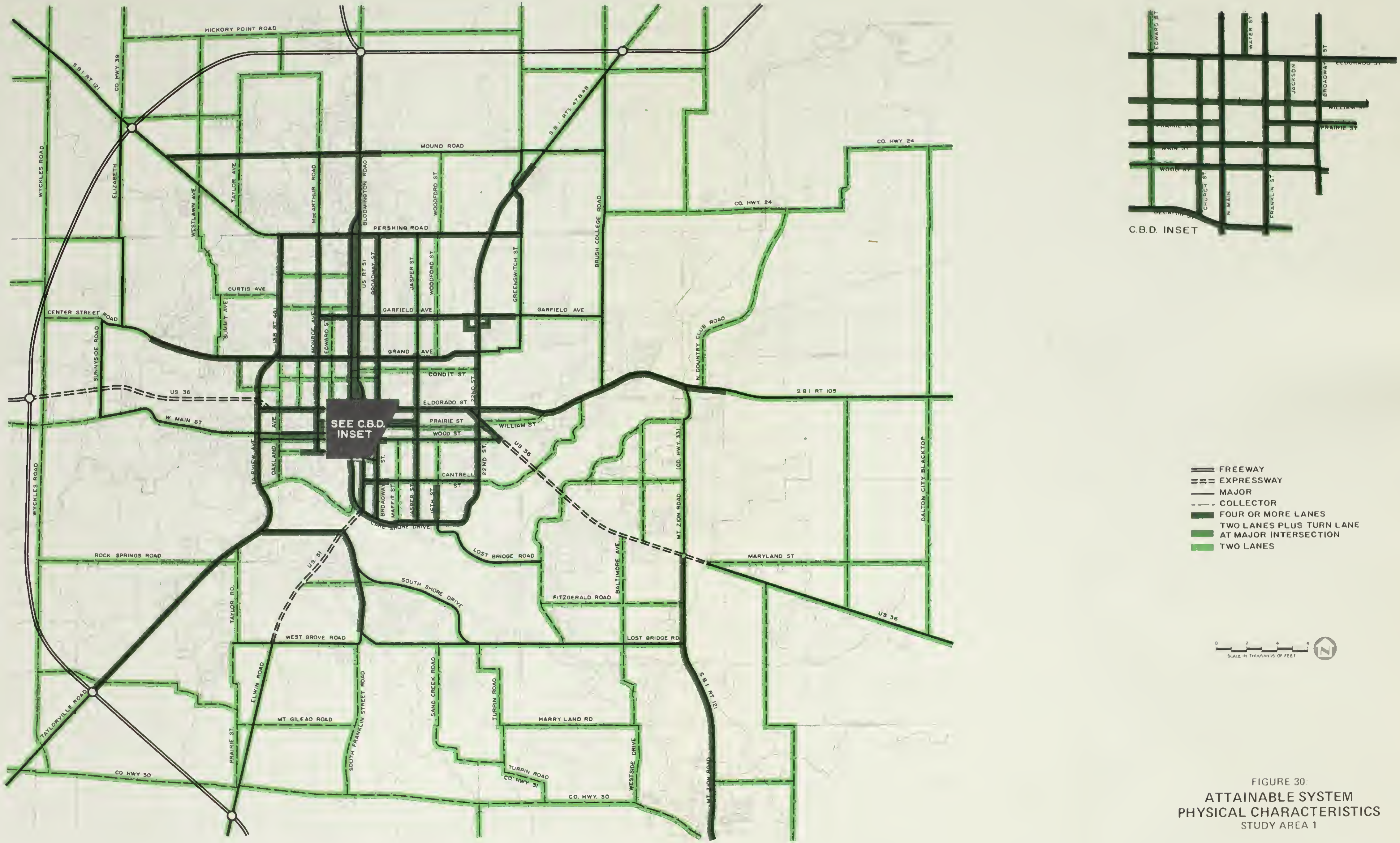

FIGURE 30:

ATTAINABLE SYSTEM
PHYSICAL CHARACTERISTICS

STUDY AREA 1

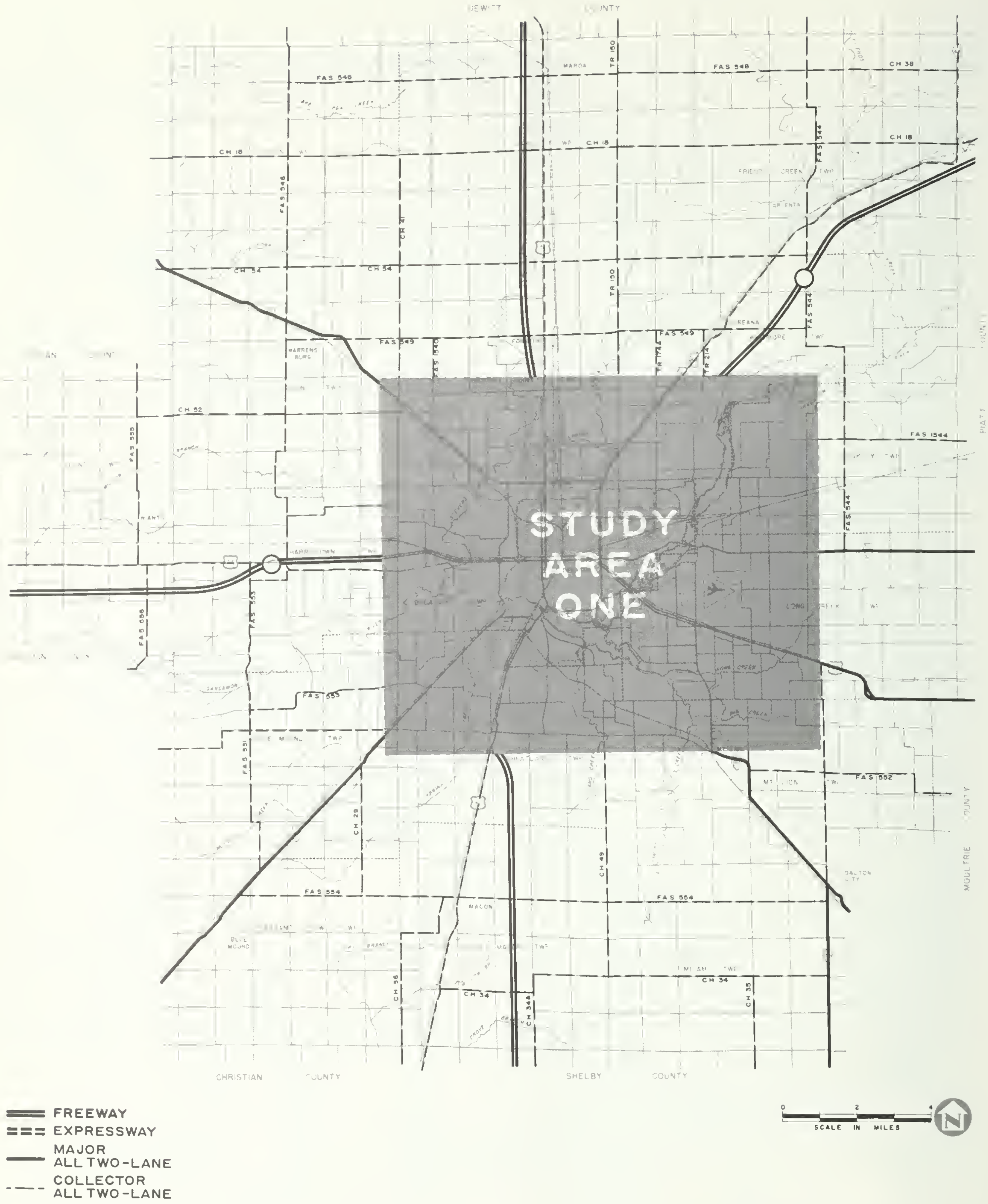

FIGURE 31:

ATTAINABLE SYSTEM PHYSICAL CHARACTERISTICS

STUDY AREA 2

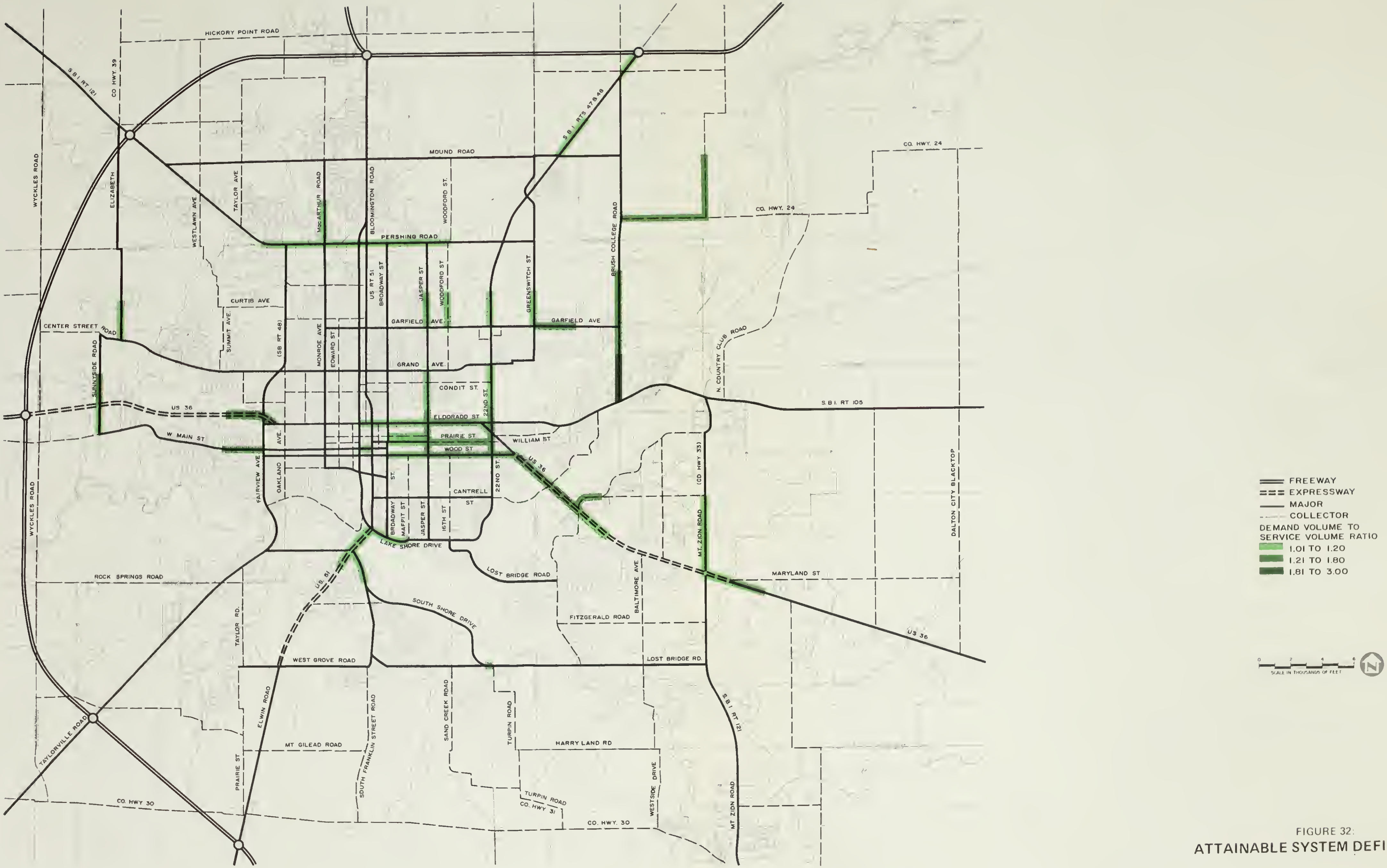

FIGURE 32:
ATTAINABLE SYSTEM DEFICIENCIES

Stage Construction Steps

Systems defined in each phase of plan preparation may be viewed as stage construction steps leading to the attainment of desired goals for the future transportation system. The Recommended System represents the overall goal for implementation, although the cost of a construction program of this magnitude would exceed projected financial resources of the participating agencies. Projects of the Minimum Recommended System represent the minimum program of improvements providing less than desired, but acceptable, levels of service and safety for future travel demands. Since the cost of even this program would exceed projected resources, it was necessary to rank projects in order of priority to prepare the Financially Attainable Program. The successive systems were purposely defined in this manner so that, in the event that additional resources become available to participating agencies, the scope of the capital improvements program may be extended to include projects currently anticipated to be beyond the financial capacity of participating agencies.

CENTRAL BUSINESS DISTRICT PARKING SPACE REQUIREMENTS

The efficient operation of a transportation system is dependent upon adequate terminal and transfer facilities. All modes of transport require some form of facility for the loading and unloading of people or goods, and in some instances the temporary storage of transport vehicles must be accommodated. Automobile parking facilities in the central business district of Decatur, representing a specific type of terminal facility, warrant particular attention in the transportation planning process.

Concentration of business and commercial activities in the comparatively small area encompassed by the central business district results in a need for substantial parking facilities. In Decatur, as in most cities, the need for parking space in the central business district is met partly by the investment of public funds. Provision of convenient and accessible parking is essential to the success of central business district enterprises in competition with outlying enterprises.

The evaluation of parking facilities in the central business district was accomplished in the following manner. An inventory of existing facilities and the use made of these facilities was conducted. Inventory data were analyzed to determine characteristics of parkers and also were studied to determine relationships between demand for parking space and trip making recorded in origin-destination surveys. Future parking needs were estimated from the application of these relationships to the forecast of trip generation derived by traffic models.

The inventory of central business district parking facilities covered an area of about 50 city blocks, bounded by the Norfolk and Western Railroad right-of-way and Broadway, Macon, and Union Streets. All parking spaces within this area were inventoried, including those in public and private lots, commercial parking garages, and curbside spaces. Inventory data were recorded on maps, as well as on coding forms specified by the Illinois Division of Highways. Each facility (or block face, in the case of curbside spaces) was described by recording the type of parking, number of spaces available and occupied, restrictions, time limits, and hourly rates. A detailed description of inventory findings is contained in Interim Report 9.

At the time of inventory (April, 1965) there were 4,419 parking spaces in the central business district study area. A significant number (1,357) were curbside spaces. Off-street lots and garages accounted for the remaining 3,062 spaces. About a third of the off-street spaces were not open to the general public, however, being restricted to the use of employees or patrons of specific establishments.

Characteristics of parkers in the central business district were inventoried by means of a postcard survey. A brief questionnaire on the back of a pre-addressed postcard was distributed to all parkers in the area at the time of peak parking accumulation (2:00 P.M.) on the survey day. Information collected in this inventory included identification of the facility, trip purpose, times of arrival and departure, and distance between the parking space and the actual destination of the trip. Along with the postcard survey, the number of vehicles parked in each facility was recorded at several times during the day.

Analysis of these data indicated that characteristics of parkers in Decatur were significantly different from typical characteristics in cities of comparable size. It was noted that the proportion of parkers reporting work as a trip purpose was unusually high, accounting for about 60 percent of total parkers in Decatur, compared to 20 percent of total parkers in most cities. It also was noted that use of space was relatively high throughout the day, and did not exhibit the sharp peaks usually characteristic of most central business districts.

Characteristics of parkers are shaped by the services available to some extent. In Decatur's central area, many curb spaces were not restricted to short-term parking, or where restrictions were in effect, they were not strictly enforced. Parking fees in many off-street facilities were low enough so that they were used by long-term parkers also. As a result, employees in the central area occupied a large proportion of the spaces available to the general public. It was surmised that this caused persons making trips to the central area for other (non-work) purposes to schedule their trips for times during which they could find a parking space. This resulted in a relatively high rate of use throughout the day. Initial recommendations[4] for changes in parking facility operations included modifications to fee structures and time restrictions to achieve a more favorable balance between long-term and short-term facilities, as well as the provision of additional spaces for the general public.

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[4] Barton-Aschman Associates, Inc., *Financial Feasibility Study for Expanding the Parking System in Downtown Decatur*, Chicago, 1965.

In the origin-destination survey, information had been collected regarding trip origin and destination, mode of travel, and trip purpose. Persons making a trip by the auto driver mode of travel also were asked to report the type of parking facility utilized at their trip destination. A tabulation of these data for all auto driver trips destined to central business district zones was analyzed to determine relationships between trips and parking demands.

Based on origin-destination survey data, about 32,100 auto driver trips were destined to the central business district on a typical weekday in 1964. Classified by general purpose, these represented 7,700 work trips and 24,400 non-work trips. All of the drivers destined to the central business district for work reported that they had parked their automobiles, compared to 83 percent of drivers making a trip for non-work purposes. Consequently, it was estimated that, during the course of a typical weekday, about 28,000 motorists sought a parking place in or near the central business district.

This daily total of parkers is not directly indicative of parking needs, since many spaces are used over and over again by several different parkers during the day. Parking needs are more directly related to peak-parking demand, or to the maximum number of vehicles accumulated in the central business district at any time of the day. It is logical to expect that the peak-parking demand would increase in proportion to an increase in the daily total number of parkers, however.

Ratios of peak-parking demand to total daily auto driver destinations were computed with peak-parking demand data compiled in the parking inventory and auto driver destinations tabulated from the origin-destination survey. The ratio for work trips was 0.26, and for non-work trips 0.06 spaces required per destination. The ratio for all trips (work and non-work combined) was 0.11. These rates, especially those for non-work trips, are lower than generally found for a city the size of Decatur.

A low ratio of peak demand to total auto driver trip destinations is not unusual in view of the inventoried relatively high rate of usage. As discussed above, this was surmised to be the effect of a shortage of convenient, short-term spaces available to the general public.

Future parking demands in the central area were estimated from the forecast of trip ends derived by traffic models. A graphic summary of surpluses or deficiencies in parking spaces by traffic zone is shown in Figure 33. The peak-parking demand was computed to be 15 percent of vehicular trip ends, rather than the 11 percent noted in the surveys. It was assumed that with the provision of additional spaces and implementation of controls on short-term facilities, parker characteristics in

Decatur will tend to approach rates typical of cities of comparable size.

A walking distance of two blocks or less was selected as the maximum acceptable separation between parking facilities and establishments to be served. This resulted in the greatest deficiencies in the northern part of the central area, where space for parking facilities is at a premium. In the central area as a whole, the peak-parking demand is forecasted to increase from 3,450 parkers in 1965 to 6,370 parkers in 1985. A large part of this increase represents a higher level of service in the forecast year, reflected in the higher proportion of total daily trip ends assumed for the peak demand. During this same period (1965 to 1985), anticipated removals and additions of spaces in the central area would result in a net change from 4,419 to about 5,690 spaces supplied. Municipal garages were recently constructed in Zones 4190 and 4250, and Sears, Roebuck and Company constructed an off-street lot concurrent with relocation of its store in Zone 4250. Also, an additional municipal lot may be constructed in Zone 4230. The removal of curbside parking spaces along arterial streets also was a factor in the computation of the future supply.

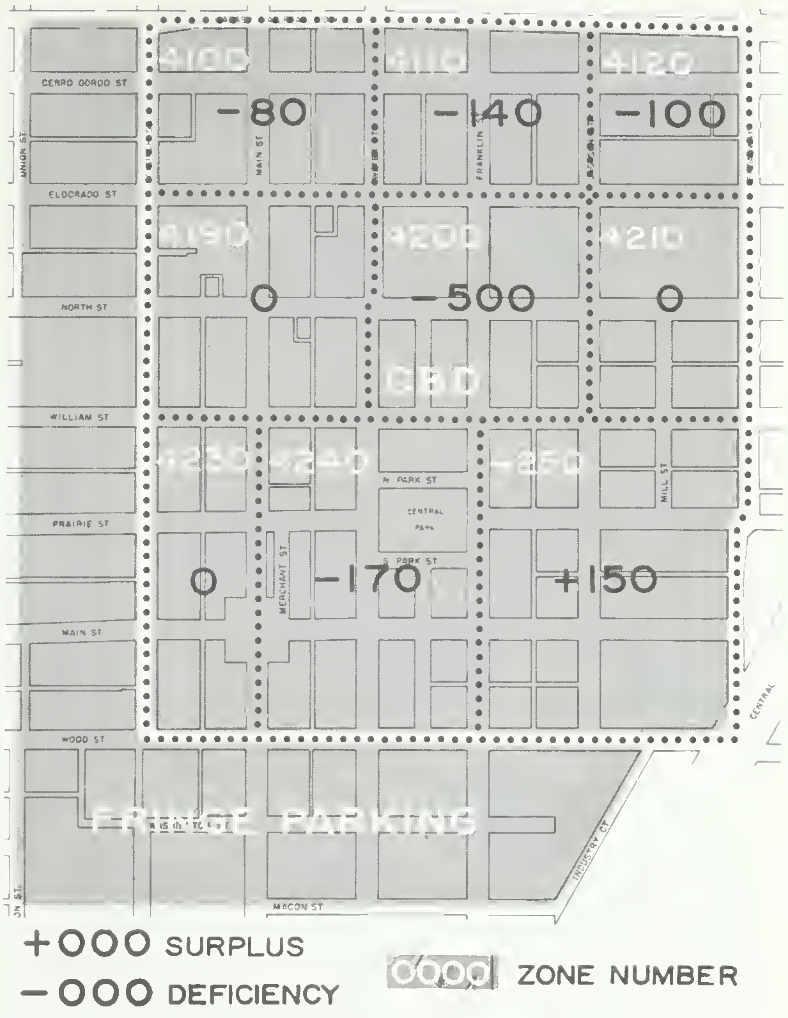

FIGURE 33:
PARKING SURPLUSES AND DEFICIENCIES

PLAN IMPLEMENTATION

CHAPTER 5

As stated in the introduction to this report, the comprehensive transportation planning process is, in the final analysis, a tool for the use of elected officials. Implementation of the process requires definite courses of action on the part of local governmental agencies. Recommendations for plan implementation developed during this study are meant to ensure the continuity of the planning process, as well as to define specific steps required to attain stated objectives.

The first part of this chapter presents a short-range program of activities, from 1970 to 1975. Specific improvements to the arterial street and highway system have been described as a guide to participating agencies for preparation of capital improvements programs. Revisions to local laws and ordinances also have been suggested so that agencies may control regional development affecting the efficiency of the transportation system

The second section of this chapter presents recommendations for the continuing process. The continuing process is a program of activities designed to maintain current data on regional development, transportation facilities, and travel characteristics, so that transportation plans may be reviewed periodically in the light of actual trends. Recommendations for arterial street and highway system improvements will be a major product of the continuing process. These recommendations will be prepared on an annual basis and may be used to extend capital improvements programs to continuously maintain a five-year schedule of projects for each of the participating agencies.

SHORT-RANGE PROGRAM

Recommendations for the improvement of streets and highways have been grouped in two general categories: major projects and traffic engineering improvements. Major projects include improvements involving construction of new facilities or reconstruction of an existing facility to a significantly higher design standard over an extended portion of the route. This type of project generally entails a substantial investment of capital improvement funds. Traffic engineering improvements are spot improvements by which the efficiency or safety of a facility is increased through the correction of minor deficiencies at comparatively low cost.

Maintenance projects form a third category of direct expenditures on streets and highways, but these projects ordinarily have little effect on arterial system capacity. Patching of the roadway surface, resurfacing, and similar projects required for the preservation of existing facilities are included in the maintenance category. No specific recommendations for maintenance projects have been prepared, but the allocation of funds for routine maintenance has been considered in the projection of funds available for street and highway expenditures.

Short-Range Capital Improvements

Major projects recommended for the period 1970 to 1975 are identified in Figure 34. The scope of this short-range program of improvements is, of course, limited by the financial resources available to participating agencies. Projects were selected in order of priorities established within each jurisdiction, until estimated costs of the program approached resources projected for each jurisdiction during the period 1970 to 1975.

After selecting projects to be included in the short-range program of improvements, cost estimates for these projects were prepared in greater detail. A summary of project costs (expressed in 1964 dollars) is listed in Table 19, along with the project location, jurisdiction, and cross section. Project numbers conform with the numbering shown in Figure 34.

This short-range program of capital improvements represents a first step toward implementation of the Attainable Street and Highway System by the time of the forecast year, 1985. As discussed in the preceding chapter, this system would not provide sufficient capacity to carry forecasted traffic volumes at minimum acceptable levels of service. Preliminary cost estimates indicated that about $34,000,000 (in 1964 dollars) would be required for implementation of the Minimum Recommended Street and Highway System. Financial resources projected to be available for the improvement of arterial streets and highways totaled $21,000,000 for the forecast period, which severely limited the scope of projects included in the Attainable Street and Highway System. The limitation on funds available for future expenditures is partially attributable to the extensive street and highway improvements program undertaken during the past several years.

In view of anticipated deficiencies in the Attainable Street and Highway System with respect to serving forecast 1985 traffic, additional resources for arterial street and highway improvements are critically needed. For projects defined in the Minimum Recommended Street and Highway System, city resources for street and highway improvements in the period 1970 to 1985 would have to be more than doubled (from $2,730,000 to $5,840,000), and state resources also would require a substantial increase (from $14,100,000 to $24,500,000).

The projection of resources for street and highway improvements was based on a study of highway-related receipts and expenditures for the

Table 19
INITIAL FIVE-YEAR IMPROVEMENT COST DATA

(1) Project	(2) From	(3) To	(4) Length (mi.)	(5) Functional Class	(6) Jurisdiction	(7) Proposed X Section	(8) Cost of New Construc.	(9) Number of Struc.	(10) Cost of Struc.	(11) No. of Special Intersec.	(12) Cost of Special Intersec.	(13) Width ROW to Acquire (feet)	(14) Cost of ROW	(15) Proposed ROW Width (feet)	(16) Total Project Cost (8+10+12+14)
(#2D) Jasper Street	Condit Street	Locust Street	0.21	Major	City	44' (48') (TS-52)	$ 93	-	$ -	-	$ -	6'	$ 18	66'	$ 111
(#8) U.S. 51	Pershing Road	F.A.I. 72	1.95	Major	State	2@24'-22' (EX-2)	1,641	-	-	1	61	0-90'	352	150'	2,054
(#11) Ill. 48	King Street	Division Street	0.79	Major	State	2@24'-4' (TS-32)	391	-	-	1	100	0-20'	613	80'	1,104
(#12) Ill. 48(Oakland)	Division Street	Pershing Road	1.25	Major	State	2@24'-4' (TS-32)	599	2	202	2	72	0-20'	409	80'	1,282
(#13) Ill. 48 & 121 (Pershing)	Oakland Avenue	West of N. Main St.	0.91	Major	State	2@24'-4' (TS-32)	482	1	140	2	150	30'	164	110'	936
(#20A) Mt. Zion Road	U.S. 36	Lost Bridge Road	1.06	Major	State	2@24'-18' (TS-32)	553	-	-	1	52	30'	127	110'	732
(#33) Grand Avenue	Fairview Avenue	Spring Creek	1.30	Major	City	2@24'-4' (TS-32)	660	-	-	1	75	0-80'	325	80'	1,060
(#36) Ill. 47 & 48	Pershing Road	27th Street	0.80	Major	State	2@24'-22' (EX-2)	670	-	-	1	80	70'	204	150'	954
(#46) Wycles Road	Rock Springs Road	CH. 30	2.69	Major	County	22' (D)	385	-	-	-	-	80'	54	80'	439
(#48B) Mound Road	Taylor Avenue	MacArthur Road	1.00	Major	County	44' (TS-32)	333	1	39	-	-	None	-	70'	372
						Total:	$5,806		$380		$590		$2,266		$9,042

Note: All costs are in thousands of dollars.

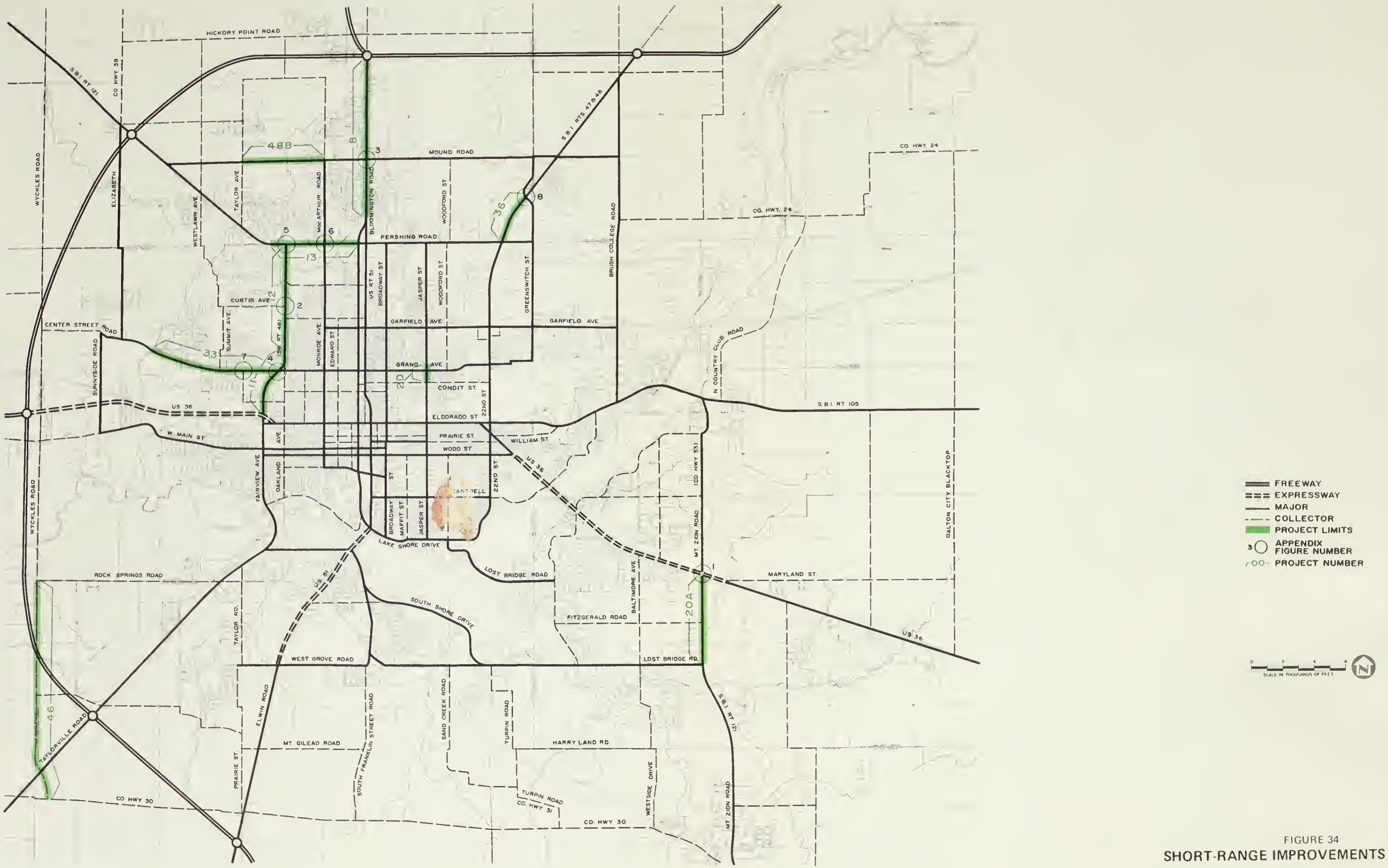

FIGURE 34

SHORT-RANGE IMPROVEMENTS PROGRAM

past several years. A detailed description of the inventory and forecast findings and techniques is presented in Interim Report 11. All local agencies responsible for the construction or maintenance of public roadways were included in this study of financial resources.

The study of past revenues was undertaken to determine trends in the revenue sources resulting from growth in the tax base and changes in the tax rate, as well as other factors. Past expenditures were tabulated so that the proportion of each agency's resources allocated to various categories of disbursement could be calculated, for subsequent use in the estimation of forecasted funds available for arterial street and highway system capital improvements. Inventory data were compiled from reports filed with the Office of the Controller, Illinois Division of Highways, and from audits of the Motor Fuel Tax Fund.

Primary resources for state route improvements were classified as federal-aid funds, federal-aid urban funds, federal-aid secondary funds, or other state construction funds. It was assumed that the annual monies available from federal-aid road funds, on a nationwide basis, would remain constant (in 1964 dollars). The amount of these funds to be allocated to the State of Illinois and local agencies within the study area was then estimated by application of formulas for distribution of each fund, using projections of population and route mileage compiled by the Bureau of Planning, Division of Highways. In this manner, a slight increase in federal-aid primary and federal-aid secondary fund allocations to the study area was forecasted, and no change was projected for federal-aid secondary funds.

Other state construction funds (non federal-aid funds) depend mainly on revenues from motor vehicle registration and motor fuel taxes. Money collected from each of these sources is expected to increase substantially, along with the trend toward a greater number of vehicles per capita. This growth will be countered by increases in higher collection and administrative costs, however, and it also is expected that a greater proportion of the revenues will be diverted to non-highway related purposes. Consequently, no change was projected for the annual amount of other state construction funds[1] available for use in the study area.

Primary resources for county route improvements were classified as property taxes and motor fuel taxes. Property tax receipts will, of course, increase along with long-term growth in the tax base, as well as with increases in tax rates. For projection of highway-related resources, it was assumed that increased revenues from property taxes would be offset by corresponding increases in construction costs, since this proved to be the case over the past several years. Consequently, forecasted county resources reflect a constant annual amount (in 1964 dollars) from property tax receipts. A substantial increase in motor fuel tax receipts projected for the state as a whole is expected to produce slightly over a 50 percent increase in the annual amount allocated to Macon County by the forecast year.

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[1] After forecasts for highway-related revenues were completed, additional funds in the amount of $130,000 per year were made available.

The forecasts for resources of the several municipalities and townships were similar to that described above for the county. Annual revenues from property taxes were averaged for the past several years and assumed to remain constant (in 1964 dollars) during the forecast period. Motor fuel tax allocations were projected to increase significantly, for all agencies, primarily due to increased receipts for the state as a whole resulting from increased vehicle usage. Precise annual allocations to each municipality were based on population projections and allocations to townships on projections of trends in township road mileage.

Highway-related receipts and expenditures projected for an average forecast year are graphically depicted in Figure 35. Although the bulk of municipal receipts and expenditures are attributable to the City of Decatur, about 10 percent of these funds are projected receipts and expenditures for the 10 incorporated villages in the outlying portion of Macon County. Township funds shown are aggregated amounts for the 17 townships in Macon County.

There is a distinct difference in the use made of funds by the several jurisdictions. The Division of Highways is expected to allocate a large proportion of funds for right-of-way and construction, as was noted in the inventory. Local agencies, on the other hand, are projected to expend relatively small amounts on capital improvements, with the major portion of their funds being allocated for maintenance and debt service. Debt service is displayed as a category of expenditure for municipal funds, due to the fact that retirement of outstanding municipal bonds has a significant impact on the resources available to the City of Decatur for capital improvements.

As shown in Figure 35, projected resources are ordinarily divided into several categories of disbursements. Funds available for arterial street and highway improvements are limited to projected disbursements for right-of-way acquisition and construction. Although the townships are projected to allocate a part of their receipts for capital improvements, it was assumed that none of this money would be available for arterial system improvements. Most of the roadways under township jurisdiction are functionally classified as local streets or highways, which are not included in the arterial system. A part (about one-fourth) of county funds also were estimated to be required for capital improvements along local streets and highways.

One means of financing necessary street and highway improvements is through the sale of bonds. Bonds are not actually a source of revenue, however, but merely a means of financing projects at a time of critical need, to be paid for with future revenues.

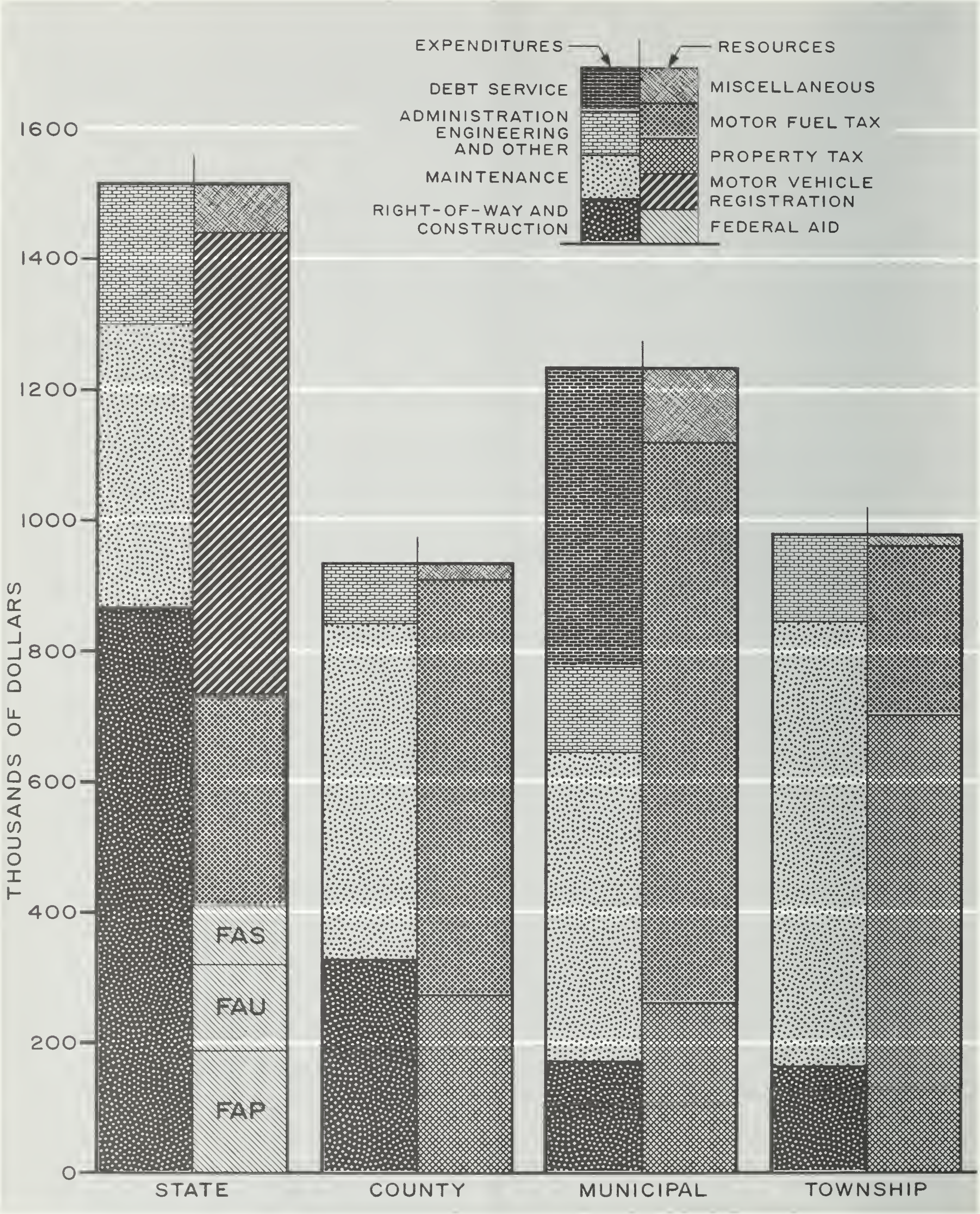

FIGURE 35:
PROJECTED RESOURCES AND EXPENDITURES

Funds for capital improvements also might be obtained through increased property tax levies. Current tax rates set by the local agencies for street, road, and bridge funds are well below maximum rates established by statute. There are, of course, considerable political pressures for maintaining the current low rates. It also must be recognized that increased property tax receipts at the county, township, or village level would not substantially augment resources for arterial system capital improvements, unless financial responsibilities for arterial system streets and highways were reassigned to a major extent. Principal deficiencies in the arterial system are anticipated in the central urbanized area, where most of the arterial system facilities fall under state or city jurisdiction.

A source of funds frequently employed by municipalities is the wheel tax. A wheel tax was considered in Decatur and was expected to yield annual revenues on the order of $340,000. Final action on the tax was not taken when aid to municipalities from state income tax receipts was announced. Enactment of a wheel tax is generally advantageous for capital improvement financing, since, as a road-user tax, the revenues may ordinarily be earmarked for street and highway improvements. Street and highway funds provided by general revenue sources, on the other hand, may be curtailed as financial needs for other community services become critical.

As additional resources (exceeding those projected in the initial study of financial resources) become available to the participating agencies, the scope of the capital improvements program may be expanded. Projected financial resources will be reviewed annually, concurrent with recommendations for extension of capital improvements programs. As mentioned above, substantial expansion of the capital improvements program will be necessary to provide even minimum acceptable service for forecasted traffic volumes.

Traffic Engineering Improvement Projects

In addition to the major projects recommended for capital improvements programs, numerous traffic engineering improvement projects designed for the spot correction of minor deficiencies were identified. Traffic engineering improvement projects are designed to attain the best possible operation and safety of existing facilities through a program of low-cost improvements. About 60 problem areas were investigated to determine the traffic engineering improvements. A detailed description of the techniques and findings of the traffic engineering improvements study is contained in Interim Report 10.

As a guide for the field survey of traffic engineering improvement needs, several warrants were established for the identification of suspected problem areas, shown in Figure 36. The first of these warrants was accident incidence. Locations at which five or more accidents, or any fatal accidents, were reported in a one-year period were selected for study. A second warrant was unusual geometric configuration; for example, streets which intersect at acute angles, offsets in alignment, or more than four approaches at a single intersection. The third warrant for identification of problem areas was forecasted traffic volumes. Intersections at which unusually heavy turning movements are anticipated, or where traffic volumes are critically high in comparison to theoretical capacity of the facility, were selected for study.

A total of 47 suspected problem areas had one or more deficiencies which are correctable by traffic engineering improvements. Corrective actions ranged from trimming natural growth in order to improve sight distance, to a few recommendations for reconstruction of facilities to improve alignment at critical intersections. Each of the recommended traffic engineering improvement projects was described by a statement of deficiencies noted, corrective action, expected benefits, and estimated cost, as listed in Appendix Table 2. The sum total of costs for recommended improvements was estimated as $288,400.

Most of the traffic engineering improvement recommendations involved activities that would not ordinarily be financed by capital improvement funds, such as paint-striping the surface, or installing a traffic control or advisory sign. The more extensive projects, involving reconstruction of a facility over a short distance, might be partially financed by the recently established TOPICS program (Traffic Operations Program to Increase Capacity and Safety). Any traffic engineering improvement implemented as part of a local TOPICS program would constitute a credit for federal-aid matching funds equal to half the project cost.

TRANSPORTATION-RELATED LAWS AND ORDINANCES

Laws and ordinances are not so obviously associated with transportation system development as street and highway improvement projects, but nonetheless are an important element in plan implementation. Future development of the region will be determined by innumerable independent decisions on the part of private investors and public officials. By means of laws and ordinances, these decisions may be guided toward desirable, or at least acceptable, patterns of urban growth.

Laws and ordinances applicable to comprehensive transportation planning include official map regulations, zoning and subdivision ordinances, traffic and parking regulations, and building codes. An evaluation was made of these laws and ordinances for all agencies in the region, as documented in Interim Report 4. Several recommendations for laws and ordinances resulted from this evaluation.

Official map ordinances are not widely used in Illinois at present, due in part to confusion over the interpretation of Illinois statutes. Adoption of an official map is recommended in spite of this difficulty, however, due to its effectiveness as a device for the reservation of street and highway rights-of-way, and reservation of lands for schools parks, or other forms of community facilities. Specific recommendations for official mapping are:

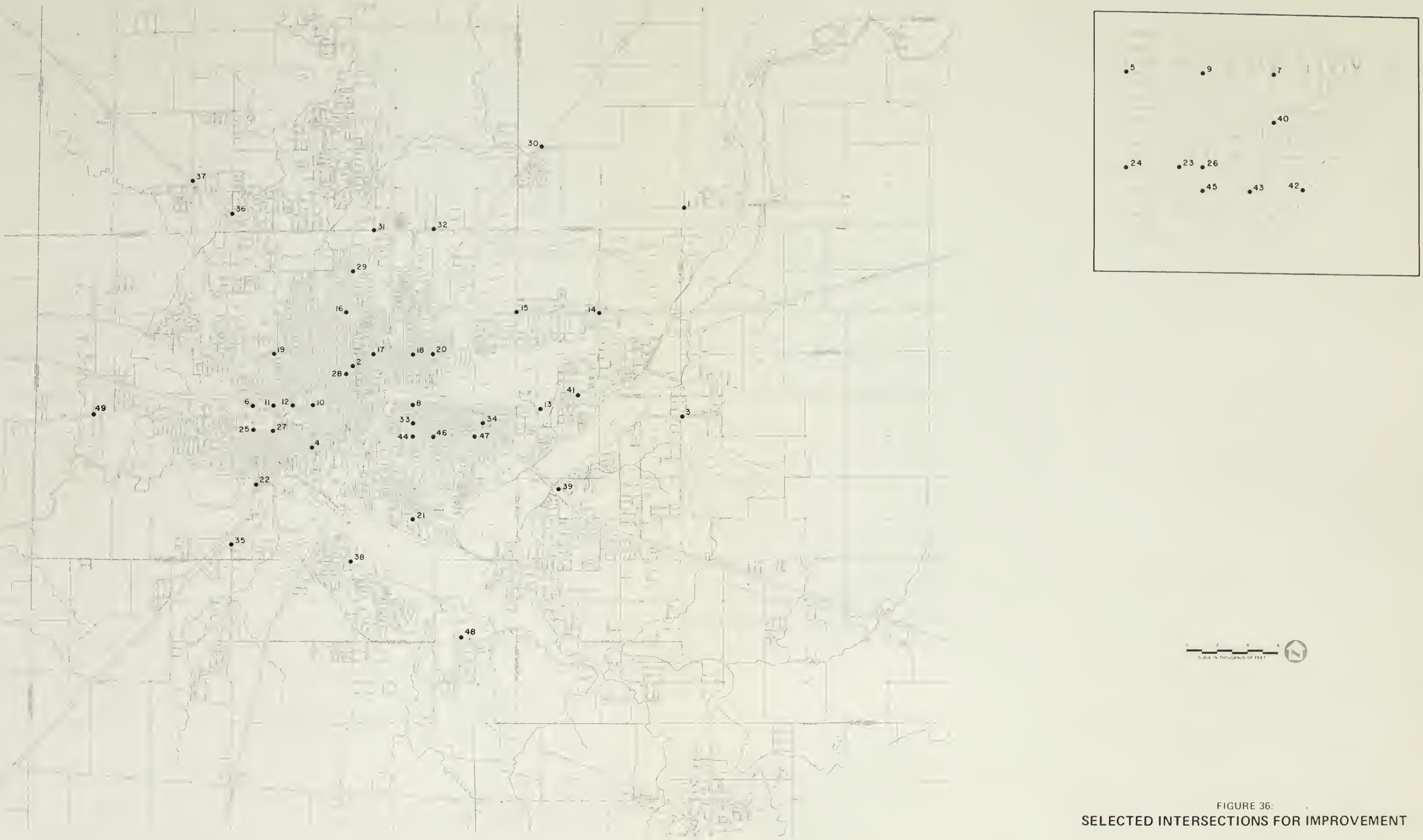

FIGURE 36:

SELECTED INTERSECTIONS FOR IMPROVEMENT

That the state enabling legislation be revised and/or clarified to permit communities to prepare and enforce optimum regulations.

That, following such clarification of the statutes, the City of Decatur and other communities in the study area adopt an official map and regulations similar to the model provided in Interim Report 4.

That, until the official map is adopted, the comprehensive plan and subdivision regulations continue to be utilized to achieve official map objectives to the extent possible.

Zoning ordinances enable local agencies to exercise control over regional development, related to both the uses made of specific properties and the physical features of site development. Two recent innovations in zoning ordinances were suggested for adoption in the region; planned development regulations and highway interchange zoning controls. Sample texts for each of these devices also were provided in Interim Report 4. Specific recommendations for existing zoning ordinances are:

That, for the City of Decatur, the sections concerning variations, special uses, off-street loading and signs be expanded to include necessary detail.

That, for the City of Decatur, the ordinance be comprehensively amended in the areas of commercial and industrial districts to preclude incompatible uses which now are allowed to pyramid from district-to-district.

That, for Macon County, substantial improvements be made in the areas of off-street loading and fence heights in yards.

That, for Macon County, a new general residence district and comprehensive planned development provisions be added to the ordinance.

That, for Macon County, the business and industrial districts be amended to prohibit the accumulation of uses from district-to-district.

Subdivision regulations are the principal device for control of the general layout and design standards utilized in newly developing urban areas. Several recommendations were made for the improvement of the city subdivision ordinance and county subdivision rules and regulations, including:

That, for the City of Decatur, certain sections be expanded to give more detail and provide the plan commission with proper guidelines, including street design standards, dedication and reservation of public lands and definitions.

That, for the City of Decatur, the administrative and enforcement provisions be clarified and specific methods of enforcement be added.

That, for Macon County, the ordinance format be revised to facilitate understanding of procedures.

That, for Macon County, all significant terms be defined.

That, for Macon County, the sections treating required improvements, dedications and reservation of land and street design standards be expanded to provide greater detail.

CONTINUING PLANNING PROCESS

The continuing process is a program of planning and engineering studies established to ensure continuity of the comprehensive transportation planning process. This program generally will involve the same activities described in the preceding chapters of this report. Studies made as part of the continuing process will be guided by techniques and findings of the initial studies and, consequently, will frequently require only minor modification of critical elements of the initial studies.

Inventory, analysis, and forecasting methods employed in the comprehensive transportation planning process are specifically designed to facilitate modifications during the continuing process. Most of the inventory and forecast data describing activities in traffic zones are recorded on punched cards. Any number of these cards may be modified to represent changes in development of specific sites in the area, and the impact on traffic flows may be estimated by application of traffic models. Changes in transportation facilities or travel characteristics also may be represented, by modification of appropriate parameters in traffic models. The modification of parameters for specific traffic models is generally a far less complicated task than derivation of initial models.

Many of the planning and engineering studies required for the continuing process are accomplished as routine activities by the staffs of participating agencies. Although in some instances the form of currently maintained files must be adapted for use in transportation planning, the program of activities required for the continuing process is, to a large degree, merely a formal statement of planning and engineering studies undertaken as a part of normal staff operations. The forecasting of future travel with traffic models represents the major difference in operations after the implementation of comprehensive transportation planning.

The organization for administration of the continuing process, displayed in Figure 37, is an outgrowth of the initial study organization described in the introduction to this report. The Coordinating Agency, responsible for overall supervision of the continuing process, is identical to the Policy Committee described before. Substitution of local staff personnel for the functions performed by the consultant in this initial study is the only significant change involved in organizing for the continuing process.

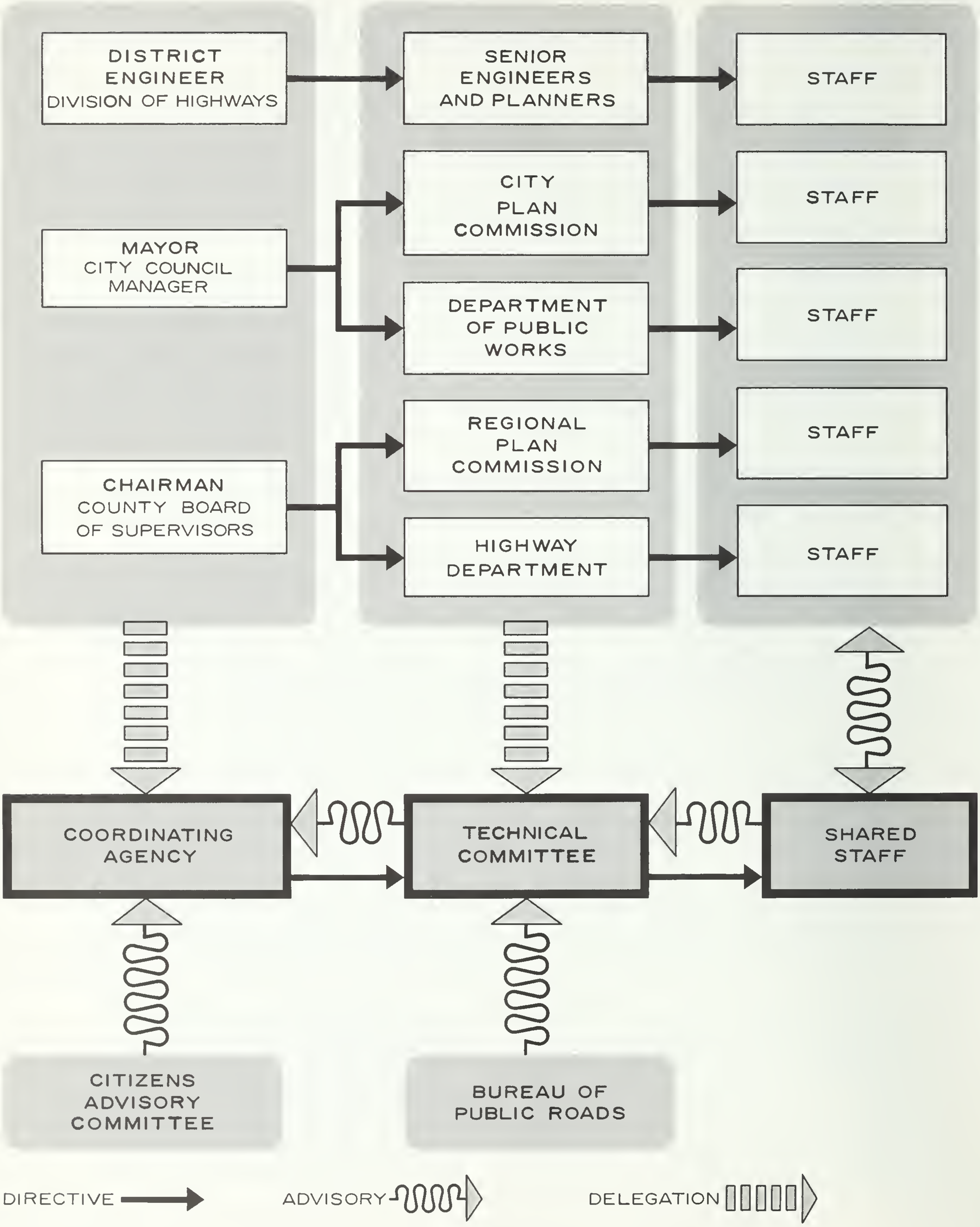

FIGURE 37:
INTERIM ORGANIZATION — CONTINUING PLANNING PROCESS

A detailed program of activities for the continuing process will be prepared on an annual basis. The Technical Committee will determine studies necessary for specific objectives, and will suggest an equitable sharing of manpower and financial responsibilities by participating agencies. Financial capabilities of the participating agencies will, of course, limit the scope of activities undertaken in any particular year.

General guidelines for the continuing process[2] were developed by the Illinois Division of Highways. Clarification of the continuing requirement of the Federal-Aid Highway Act of 1962 was provided by the Bureau of Public Roads Instructional Memorandum 50-4-69, entitled *Operations Plans for "Continuing" Urban Transportation Planning*. These guidelines describe activities generally required for adequate continuation of the comprehensive transportation process. The consultant charged with the preparation of traffic models and data files also developed recommendations for the continuing process, based on techniques and findings of this initial study. Three general phases of the continuing process are recommended for the Decatur area.

The first phase is the surveillance and maintenance program. The various aspects of urban growth, community goals and objectives, and transportation system features will be continuously monitored to maintain current data files. A major product of this phase, for transportation planning purposes, will be the identification of trends in regional development and issues affecting transportation system needs. The reliability of travel forecasts is highly dependent on regional development occurring as forecasted, and significant differences from anticipated trends would require revision of travel forecasts. Data files will form a valuable source of information for planning and engineering studies related to current problems, as well as for the basis of long-range planning.

The second phase of the continuing process is the annual review and report. Study staff personnel will summarize yearly progress for the continuing process in a brief report for distribution to participating agencies. This report will present principal findings of the surveillance and maintenance program, recommendations for transportation facilities improvements, and recommendations for future studies in the continuing process. A major product of this phase will be recommendations for extension of participating agency capital improvements programs.

The third phase of the continuing process is the major review. This review, involving a detailed evaluation of traffic modeling techniques and revision of travel forecasts, will be performed on censual and intercensal years as a minimum, although major review activities may be undertaken sooner than scheduled if the need arises. Several studies will be required in addition to those involved in the surveillance and maintenance program, so that the stability of travel characteristics and reliability of traffic models may be tested. The end result of the major review will be an extension of the forecast period for future travel estimates, based on the most probable trends in regional development at the time of updating the forecasts.

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[2] *The Continuing Process for Comprehensive Transportation Planning*, Illinois Department of Public Works and Buildings, Division of Highways, August, 1967.

Overall direction for the planning of transportation facilities is, of course, guided by the goals and objectives of citizens served by the system. Statements of goals and objectives currently defined for regional development and transportation system planning were listed in earlier chapters of this report. The modification of goals and objectives, in order to meet changing needs and desires of area residents, is an essential element of the continuing planning process.

LONG-RANGE STREET AND HIGHWAY SYSTEM

Financial constraints generally preclude the complete attainment of desired goals. Nonetheless, the implementation of a long-range street and highway system is greatly eased by early identification of key facilities. Reservation of adequate right-of-way prior to development of an area can result in substantial savings to the general public and also will guide development of the area so that it is compatible with the long-range transportation system.

Long-range planning considerations for streets and highways in the Decatur area are shown in Figures 38 and 39. In the central area, existing development exerts a major force on the selection of route alignments for future facilities. There are several areas where continuity of the system may be improved by provision of connections between established facilities, however. No changes in marked routes were found to be essential to implementation of the long-range street and highway system, although concurrent with the construction of a major east-west facility south of Lake Decatur (such as that shown along the alignment of Grove Road in Figure 23, or in the Mount Gilead Road-County Highway 30 corridor depicted in Figure 38), it is recommended that the new facility and appropriate sections of I-72 and F-12 be marked as the Route U.S. 36 Bypass. Identification of major facilities outside of the existing urbanized area, well in advance of urban growth, will form a framework for regional development, as well as ensure the adequate service of future travel demands.

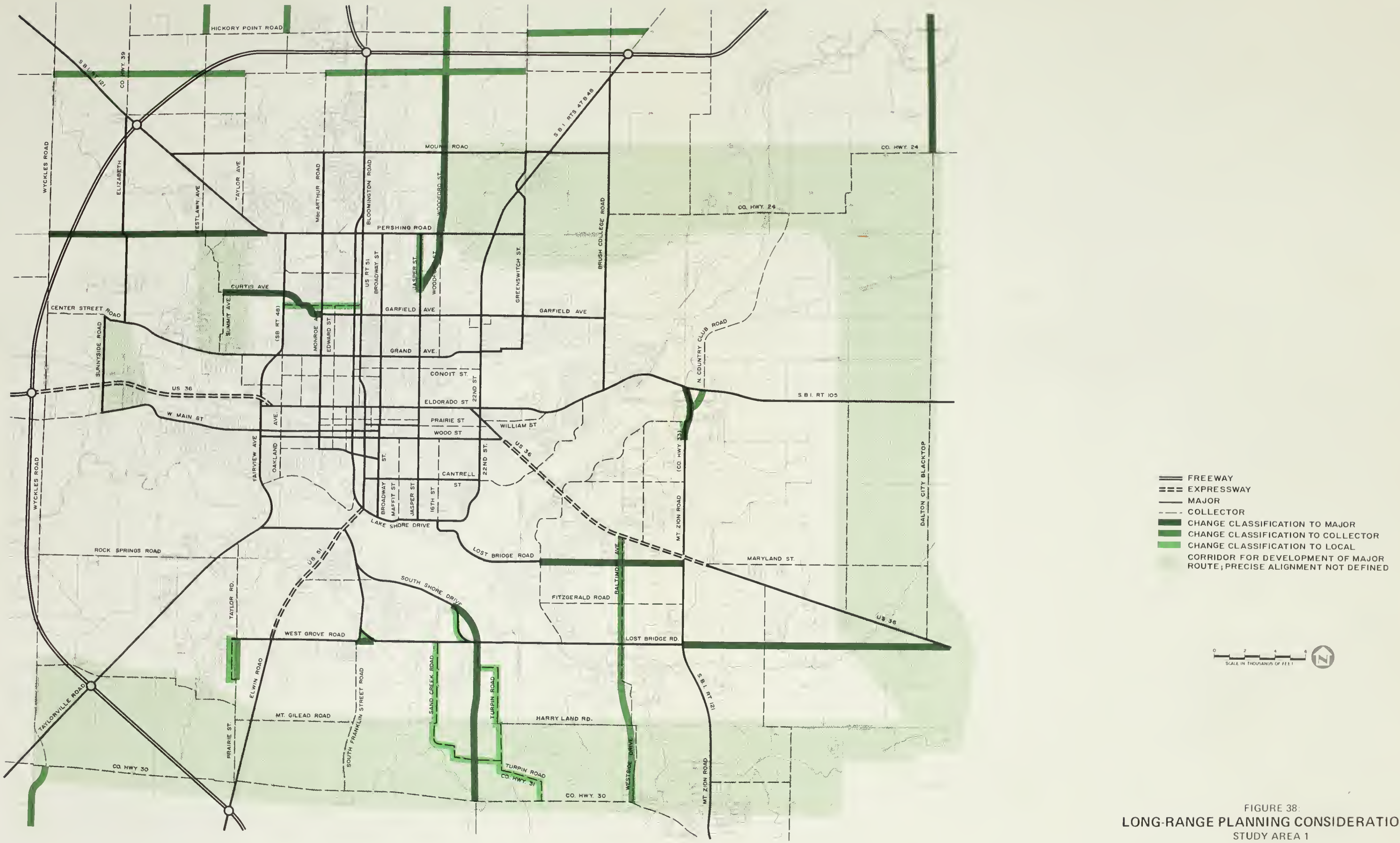


FIGURE 38

LONG-RANGE PLANNING CONSIDERATIONS

STUDY AREA 1

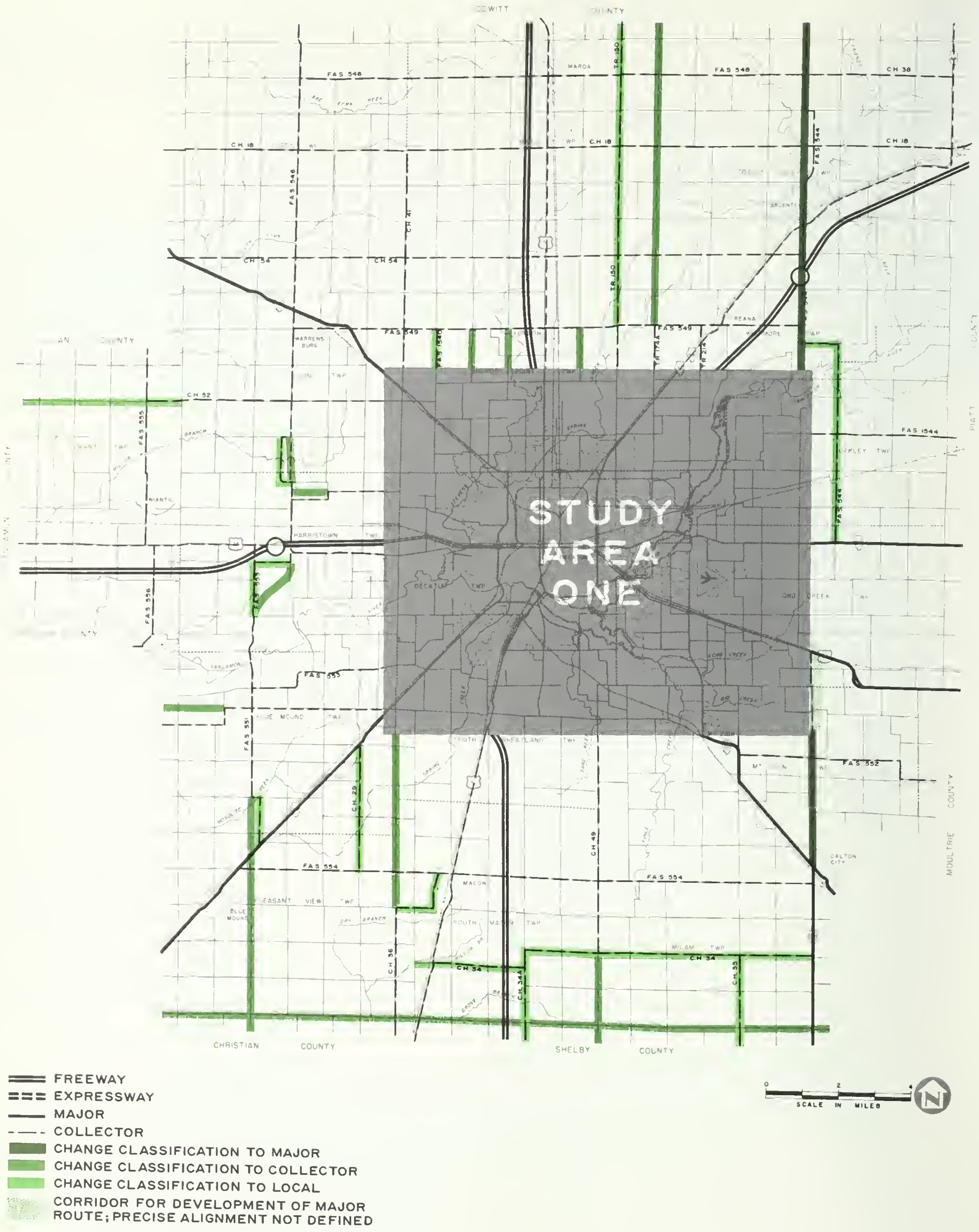


FIGURE 39:
LONG-RANGE PLANNING CONSIDERATIONS
STUDY AREA 2

APPENDIX

Appendix Table 1
PROJECT SPECIFICATIONS AND COSTS

Project Number	Route	From	To	Juris.	Length (Miles)	Exis. X-Sec.	Prop. X-Sec.	X-Sec. Type	Cost ($1,000's)				Staging
									Rdwy.	Struc.	ROW	Total	
1	Wood St.	Broadway	U.S. 36	City	1.55	34'-40'	44'	TS-52	$ 553	-	$ 21	$ 574	Min.
2	Jasper St.	Pershing	Garfield	-	1.05	22'-30'	44'	TS-52	354	-	26	380	Rec.
2A	Jasper St.	Garfield	Locust	City	0.45	30'	44'	TS-52	140	-	-	140	Min.
2B	Jasper St.	Condit	Eldorado	City	0.48	30'-46'	44'	TS-52	140	$1,300	-	1,440	Att.
2C	Jasper St.	Eldorado	Wood	City	0.39	40'	44'	TS-52	153	-	-	153	Min.
2D	Jasper St.	Condit	Locust	City	0.21	30'	44'	TS-52	93	-	18	111	Att.
3	22nd St.	Condit	Eldorado	State	0.50	30'	2 @ 26' (4')	TS-32	250	3,140	-	3,390	Min.
4	McKinley Ave.	Water	Broadway	-	0.25	-	36'	C-1	73	-	35	108	Rec.
4A	McKinley Ave.	Broadway	Jasper	-	0.50	-	36'	C-1	146	-	70	216	Rec.
5	McKinley Ave.	Jasper	22nd	City	0.75	-	36'	C-1	217	-	104	321	Min.
6	Broadway St.	Pershing	Broadway	-	0.25	-	36'	C-1	73	-	35	108	Rec.
7	Broadway St.	Mound	T.R. 63	-	1.05	-	36'	C-1	304	-	29	333	Rec.
8	U.S. 51	Pershing	I-72	State	1.95	22'	2 @ 24' (22')	EX-2	1,702	-	352	2,054	Att.
9	Ill. 48	South Side	Sunset	State	1.28	22'	2 @ 26' (4')	TS-32	641	430	-	1,071	Att.
10	Ill. 48	Sunset	U.S. 36	State	0.83	37'	2 @ 26' (4')	TS-32	924	-	231	1,155	Att.
11	Fairview Ave.	King	Division	State	0.79	22'	2 @ 24' (4')	TS-32	491	-	613	1,104	Att.
12	Oakland Ave.	Division	Pershing	State	1.25	19'-40'	2 @ 24' (4')	TS-32	671	202	409	1,282	Att.
13	Pershing Rd.	Oakland	Main	State	0.91	22'	2 @ 24' (18')	TS-32	632	140	164	936	Att.
14	Ill. 48	South Side	Alice	State	1.41	22'	2 @ 26' (4')	TS-42	705	-	-	705	Att.
15A	Jasper St.	Pershing	Mound	-	1.15	-	44'	TS-52	384	-	31	415	Rec.
15B	Woodford St.	Mound	T.R. 63	-	1.00	-	36'	C-1	290	-	3	293	Rec.
16	South Side Dr.	East of	Ill. 48	State	0.53	24'	2 @ 26' (4')	TS-42	266	-	-	266	Att.
17	Main St.	Elizabeth	Fairview	-	1.85	18'-40'	2 @ 26' (4')	TS-42	926	-	7	933	Rec.
17	Main St.	West of	Fairview	City	0.10	40'	Intersection Treatment		30	-	-	30	Min.
18	Brush College Rd.	C.H. 24	William	City/County	2.20	22'	2 @ 26' (4')	TS-42	1,100	600	4	1,704	Min.
19	Maryland St.	Country Club	U.S. 36	City	1.95	0'-32'	36'	TS-51	564	-	31	595	Min.
20A	Mt. Zion Rd.	U.S. 36	Lost Bridge	State	1.06	18'	2 @ 24' (18')	TS-32	605	-	127	732	Att.
20B	Mt. Zion Rd.	Lost Bridge	F.A.S. 552	State	2.64	18'	2 @ 24' (18')	TS-32	1,500	-	49	1,549	Att.
21	Lost Bridge Rd.	U.S. 36	Mt. Zion	-	3.25	-	2 @ 24' (18')	EX-2	2,730	-	122	2,852	Rec.
21	Lost Bridge Rd.	U.S. 36	Mt. Zion	State	3.25	-	24'	C	1,660	-	122	1,782	Min.
22A	Lost Bridge Rd.	Mt. Zion	34th	State	1.25	24'	2 @ 24' (18')	EX-2	1,050	-	30	1,080	Min.
22B	Grove Rd.	34th	Twp. Line	State	0.75	-	2 @ 24' (18')	EX-2	420	1,450	20	1,890	Min.
22B	Grove Rd.	34th	Twp. Line	County	0.75	-	24'	C	256	725	20	1,001	Att.
22C	Grove Rd.	Twp. Line	U.S. 51	State	3.00	0'-20'	2 @ 24' (18')	EX-2	2,510	520	87	3,117	Min.
23	Grove Rd.	U.S. 51	Ill. 48	State	1.35	0'-22'	2 @ 24' (18')	EX-2	1,130	54	-	1,184	Min.
24	Grove Rd.	Ill. 48	Wyckles	State	1.75	-	2 @ 24' (18')	EX-2	1,470	520	70	2,060	Min.
25	Major Street	Ill. 121	Grove	-	5.70	-	2 @ 26' (4')	TS-42	2,860	1,240	1,008	5,108	Rec.
27	Pershing Rd.	Elizabeth	Pershing	-	1.20	-	2 @ 26' (4')	TS-42	1,010	-	61	1,071	Rec.
28	Westlawn Ave.	Pershing	Summit	-	1.00	-	36'	C-1	290	-	28	318	Rec.
29	Westlawn Ave.	Ash	T.R. 63	-	0.50	-	36'	C-1	145	-	7	152	Rec.
30	T.R. 63	Elizabeth	Taylor	-	1.50	-	36'	C-1	434	-	21	455	Rec.
31	T.R. 63	MacArthur	Greenswitch	-	2.60	-	36'	C-1	751	-	36	787	Rec.
32	Hickory Point Rd.	West Lawn	Brush College	-	5.00	16'-20'	36'	C-1	1,450	-	37	1,487	Rec.
33	Grand Ave.	Fairview	Spring Creek	City	1.30	40'	2 @ 24' (4')	TS-32	735	-	325	1,060	Att.
34	William Street Rd.	Eldorado	Excelsior	State	1.60	24'-33'	2 @ 26' (18')	TS-32	1,230	-	500	1,730	Min.
35	F.A.S. 1547	North of U.S. 36		-	1.00	-	22'	D	130	-	21	151	Rec.
36	Ill. 47 and 48	Pershing	27th	State	0.80	44'	2 @ 24' (22')	EX-2	750	-	204	954	Att.
37	Wood-Broadway	At I.C.R.R.		-	Grade Separation at Railroad			-	200	460	-	660	Rec.
38	Eldorado St.	At I.C.R.R.		-	Grade Separation at Railroad			-	131	2,880	-	3,011	Rec.
39	Broadway St.	At N.&W.R.R.		City	Grade Separation at Railroad			-	108	900	-	1,008	Min.
44	Dalton City Blacktop Rd.	At N.&W.R.R.		-	Grade Separation at Railroad			-	125	253	-	378	Rec.
45	F.A.S. 546	At N.&W.R.R.		-	Grade Separation at Railroad			-	43	112	-	155	Rec.
46	Wyckles Rd.	Rock Springs	C.H. 30	County	2.69	-	22'	D	385	-	54	439	Att.
47	N. Country Club Rd.	William	C.H. 24	County	2.46	0'-22'	22'	D	319	155	52	526	Att.
48A	Mound Rd.	Elizabeth	Taylor	-	1.46	-	44'	TS-52	486	-	23	509	Rec.
48A	Mound Rd.	Ill. 121	Taylor	County	0.89	-	44'	TS-52	296	-	14	310	Min.
48B	Mound Rd.	Taylor	MacArthur	County	1.00	20'	44'	TS-52	333	39	-	372	Att.
49	MacArthur Rd.	Pershing	T.R. 63	City/County	2.00	20'	44'	TS-52	667	-	18	685	Min.
50A	Eldorado St.	At Monroe		-	0.20	52'	Intersection Treatment		60	-	-	60	Rec.
50B	Eldorado St.	At Jasper		-	0.20	66'	Intersection Treatment		60	-	-	60	Rec.
51A	Pershing Rd.	At Broadway		-	0.20	2 @ 26' (18')	Intersection Treatment		60	-	-	60	Rec.
51B	Pershing Rd.	At Jasper		-	0.20	2 @ 26' (18')	Intersection Treatment		60	-	-	60	Rec.
52	F.A.S. 546	T.R. 77A	T.R. 101A	-	1.00	-	22'	D	130	-	10	140	Rec.

Appendix Table 2
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's)			Comments
			ROW	Construction	Total	
1. CH 24 and TR 200	Cut back natural growth along roadway.	Improve sight distance.	-	$ 4	$ 4	-
					$ 4	
2. Condit Street, Packard Street, and Water Street	Designate Packard as a one-way westbound street; install ONE WAY, DO NOT ENTER, and turn prohibition signs as appropriate.	Eliminate sight distance restrictions.	-	$ 6	$ 6	-
					$ 6	
3. Country Club Road and Airport Road	Realign Airport Road.	Increase capacity and reduce accident hazard.	$ 70	$ 356	$ 426	See Figure 5.
					$ 426	
4. Decatur Street and Monroe Street						
Decatur (W)	Remove parking, 150 feet, both sides; stripe three lanes including an exclusive left-turn lane.	Increase capacity.	-	$ 2	$ 2	-
Decatur (E)	Remove parking, 150 feet, both sides.	-	-	-	-	
Monroe (N)	Stripe for four lanes.	-	-	3	3	
					$ 5	
5. Eldorado Street and Edward Street	Signalize intersection.	Increase capacity and eliminate the probable cause of 40 percent of the accidents inventoried.				
Edward (S)	Install one-way sign opposite parking lot exit.		-	$ 90	$ 90	-
					$ 90	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's)			Comments
			ROW	Construction	Total	
6. Eldorado Street and Fairview Avenue	Lengthen NE and SE turn radii for trucks.	Increase capacity and facilitate heavy movements between these state routes.	-	$ 9	$ 9	-
Fairview (N)	Stripe three lanes including an exclusive left-turn lane.		-	2	2	
Fairview (S)	Widen east side to provide a right-turn lane (length = 150 feet).		-	40	40	
					$ 51	
7. Eldorado Street and Jackson Street	Install 12 inch red lenses and signal backplates facing both legs of Eldorado.	Increase signal target value and reduce potential for accidents.	-	$ 3	$ 3	-
					$ 3	
8. Eldorado Street and Jasper Street	Remove all parking within 150 feet of the intersection; install 12 inch red lenses and signal backplates on all signal heads; install pedestrian signals and paint crosswalks and stop lines on each leg. Provide an exclusive turn phase on Eldorado.	Increase capacity, and reduce congestion and accident hazard.	- - - -	$ 6 12 5 15	$ 6 12 5 15	This is the most critical intersection in study. (See Figure 2.)
Jasper (N)	Stripe three lanes including exclusive left lane.		-	-	-	
Jasper (S)	Stripe four lanes.		-	-	-	
Eldorado (E)	Stripe five lanes including exclusive left lane.		-	-	-	
Eldorado (W)	Stripe five lanes including exclusive left lane.		-	14	14	
					$ 52	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's) ROW	Construction	Total	Comments
9. Eldorado Street and North Main Street	Lengthen clearance intervals; install 12 inch red lenses and signal lockplates on both legs of Eldorado.		-	$ 6	$ 6	-
Eldorado (E)	Install one-way signs at near-right and far-left corners; stripe and mark pavement for exclusive left-turn lane.	Eliminate possible causes of accidents.	- -	1 5	1 5	
					$ 12	
10. Eldorado Street and Monroe Street	Install 12 inch red lenses and signal backplates on both legs of Eldorado; provide an addition phase for opposing left turns on Eldorado.	Increase signal target value, reduce the potential for accidents and increase capacity.	- -	$ 6 15	$ 6 15	-
Eldorado	Stripe three lanes including an exclusive left-turn lane on both legs.		-	5	5	
					$ 26	
11. Eldorado Street and Oakland Avenue	Install 12 inch red lenses and signal backplates on Eldorado.	Increase signal target value.	-	$ 6	$ 6	-
Oakland (N)	Reconstruct and widen four feet; stripe three lanes including exclusive left-turn lane (length = 75 feet).	Increase capacity, and accommodate heavy turns.	-	85	85	The north leg needs reconstruction to improve grade.
					$ 91	
12. Eldorado Street and Van Dyke Street	Improve intersection lighting (two luminaires); provide an "all red" clearance indication until the building on the NE corner is removed.	Reduce accident potential 35 percent.	-	$ 2	$ 2	Sight distance is poor between Van Dyke and the east leg of Eldorado.

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's) ROW	Estimated Cost ($100's) Construction	Estimated Cost ($100's) Total	Comments
12. Eldorado Street and Van Dyke Street - (Continued)						
Eldorado (E)	Apply surface coating to increase skid resistence at this approach.	Reduce the potential for rear-end accidents.	-	$ 14	$ 14	-
					$ 16	
13. Eldorado Street and William Street	Widen south side of Eldorado.	-	-	$ 176	$ 176	See Figure 4.
William (S)	Realign pavement; stripe two lanes.	Reduce the area of conflict and remove potential hazard.	-	28	28	
Eldorado (E)	Construct raised median with left-turn lane.		-	-	-	
Eldorado (W)	Construct raised median.		-	35	35	
					$ 239	
14. Faries Parkway and Brush College Road	Reconstruct intersection.	Increase capacity and improve structural condition.	$ 27	-	$ 27	The intersection is subject to severe peak-hour congestion, and structural deterioration.
Brush College	Widen and stripe three lanes on both legs; provide exclusive turn lanes into Faries Parkway.		-	$ 160	160	
Farics Parkway (W)	Widen and stripe four lanes (lengths = 200 feet).		-	96	96	
					$ 283	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's) ROW	Estimated Cost ($100's) Construction	Estimated Cost ($100's) Total	Comments
15. Faries Parkway and 27th Street	Signalize intersection.	Increase capacity and remove peak-hour congestion.	-	$ 90	$ 90	-
27th (N)	Widen approach 10 feet; stripe three lanes including exclusive left-turn lane (length = 150 feet).		$ 8	42	50	
					$ 140	
16. Garfield Avenue and North Main Street	-	-	-	-	-	See Figure 2.
Garfield (E)	Widen eight feet; provide an exclusive left turn in median (length = 100 feet).	Increase capacity and protection of turning vehicles.	-	$ 70	$ 70	
					$ 70	
17. Grand Avenue and Broadway Street	-	-	-	-	-	See Figure 2.
Broadway (S)	Provide exclusive left-turn lane on existing width.	Increase capacity by providing for the heavy turn.	-	$ 2	$ 2	
					$ 2	
18. Grand Avenue and Jasper Street						
Jasper (S)	Widen east side seven feet; stripe three lanes including right-turn lane.	Increase capacity on Jasper Street.	$ 11	$ 44	$ 55	-
					$ 55	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's)			Comments
			ROW	Construction	Total	
19. Grand Avenue and Oakland Avenue	Resurface approaches.	-	-	$ 40	$ 40	-
					$ 40	
20. Grand Avenue and Woodford Street	Install school zone signs on Grand.	Provide pedestrian safety in school zone.	-	$ 1	$ 1	-
					$ 1	
21. Lake Shore Drive and Jasper Street	Signalize intersection.	Interrupt flow and reduce accident potential.	-	-	-	-
Lake Shore (W)	Install SIGNAL AHEAD sign.	-	-	$ 90	$ 90	
					$ 90	
22. Lincoln Park Drive and Fairview Avenue						
Lincoln Park (E)	Relocate STOP sign closer to intersection.	Identify intersection and reduce hazard.	-	-	-	-
Fairview (N and S)	Install intersection warning signs.	-	-	$ 2	$ 2	
					$ 2	
23. West Main and Church Streets	Reconstruct curb and gutter on NE corner and increase turning radius.	Accommodate high right turns.	-	$ 9	$ 9	Sewer inlet is too low.
					$ 9	
24. West Main Street and Edward Street						
Edward (S)	Install one-way sign on west side facing service station exit.	Prevent wrong-way turns onto Edward.	-	$ 1	$ 1	-
					$ 1	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's) ROW	Construction	Total	Comments
25. West Main and Fairview Avenue	Lengthen all turning radii; paint crosswalks and stop lines.	Increase capacity by providing for heavy turns.	-	$ 23	$ 23	-
Main	Widen both approaches eight feet and stripe three lanes including opposing left-turn lanes (length - 200 feet).	-	$ 7	44	51	
					$ 74	
26. Main and Main Streets						
Main (E)	Cut back median three feet from intersection. Replace KEEP TO RIGHT sign with NO LEFT TURN sign.	Provide easier left turn and reduce the potential for accidents.	-	$ 5	$ 5	-
					$ 5	
27. West Main Street and Oakland Avenue						
Oakland (N)	Lower vertical crest in right-turn lane; paint stop lines; replace existing sign with STOP HERE ON RED; install signal on the south side of Main Street facing the right-turn lane on Oakland.	Improve sight distance. Reduce vehicle conflict and accidents.	-	$ 20	$ 20	-
					$ 20	
28. Marietta Street and North Main Street	Remove natural growth on SE corner.	Improve sight distance.	-	$ 1	$ 1	-
					$ 1	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

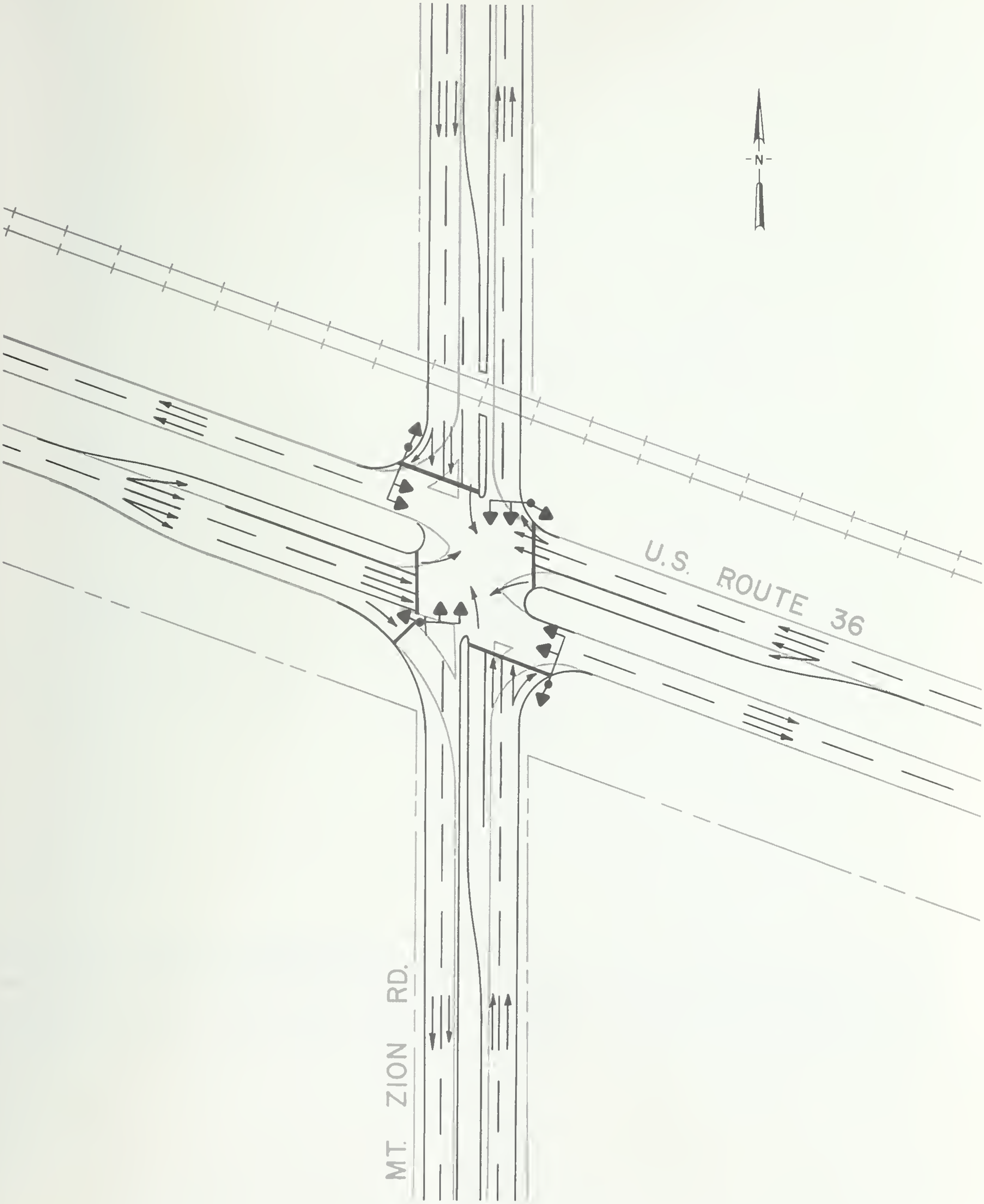
			Estimated Cost ($100's)			
Intersection	Recommended Improvements	Benefits	ROW	Construction	Total	Comments
29. McKinley Avenue and Water Street						
McKinley (W)	Remove fence and natural growth on SW corner.	Provide adequate sight distance.	-	$ 2	$ 2	-
					$ 2	
30. Mound Road and SBI 47	Illuminate intersection (four luminaires).	-	-	$ 8	$ 8	There is no lighting.
SBI 47 (N and S)	Stripe two lanes with solid yellow line, install DO NOT ENTER signs, on channelizing islands, facing SBI 47 approaches.	Prevent illegal left turns into right-turn lanes on Mound, and eliminate potential for accidents.	-	5	5	Wide right-turn lanes encourage illegal left turns.
					$ 13	
31. Pershing Road and Broadway Street	-	-	-	-	-	See Figure 2.
Broadway (N)	Restripe three lanes including exclusive left-turn lane.	Correct substandard striping and accident hazard.	-	$ 2	$ 2	Existing striping does not meet acceptable standards.
					$ 2	
32. Pershing Road and Woodford Street	Realign Woodford, north leg; signalize.	Minimize turning movements; eliminate weaving and increase capacity.	$ 50	$ 410	$ 460	See Figure 6.
Woodford (S)	Widen and stripe three lanes including exclusive left-turn lane.		-	54	54	
Pershing (E)	Close median at existing access to Woodford north leg.		-	3	3	

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

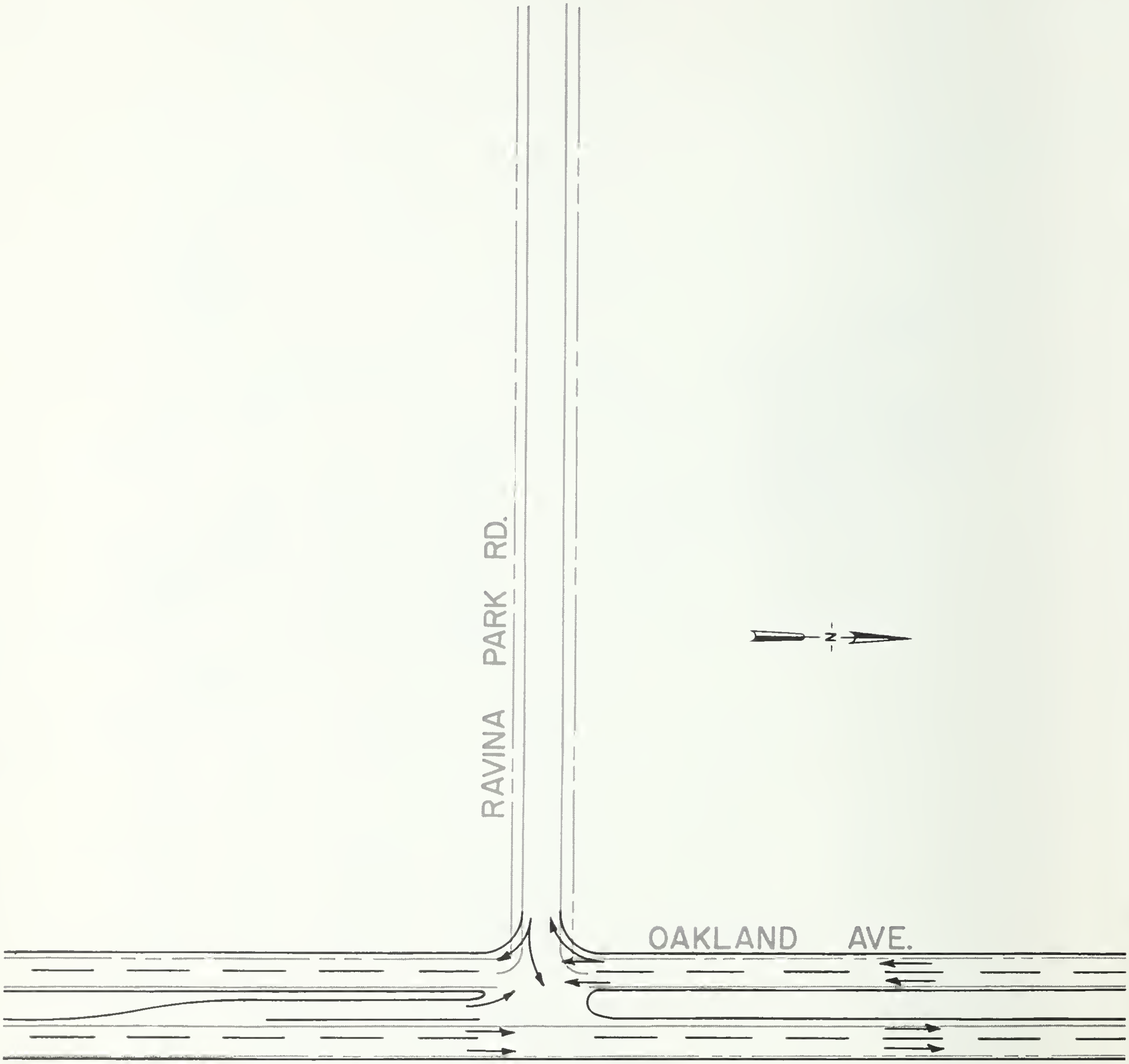
Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's) ROW	Construction	Total	Comments
32. Pershing Road and Woodford Street - (Continued)						
Pershing (E and W)	Widen and construct left-turn bays in medians; stripe five lanes.	Accommodate heavy turns.	$ 13	$ 12	$ 25	-
					$ 542	
33. Prairie Street and Jasper Street	Restripe all approaches, three lanes including left-turn lanes.	Define moving lanes and provide for high-turning movements.	-	$ 8	$ 8	-
	Lengthen turn radius of NW corner.		-	$ 9	$ 9	
					$ 17	
34. Prairie Street and U.S. 36	Cut back natural growth on SW corner.	Provide adequate sight distance between Prairie and 23rd Street.	-	$ 2	$ 2	-
					$ 2	
35. SBI 48 and Taylor Avenue						
Taylor (S)	Resurface approach; stripe two lanes.	Eliminate rough approach and potential hazard.	-	$ 10	$ 10	-
					$ 10	
36. SBI 121 and Taylor Avenue						
Taylor (N)	Reconstruct and realign; improve grade.	Improve intersection definition and eliminate hazardous conditions.	$ 2	$ 120	$ 122	See Figure 3.

Appendix Table 2 - (Continued)
RECOMMENDED IMPROVEMENTS, BENEFITS, AND ESTIMATED COSTS

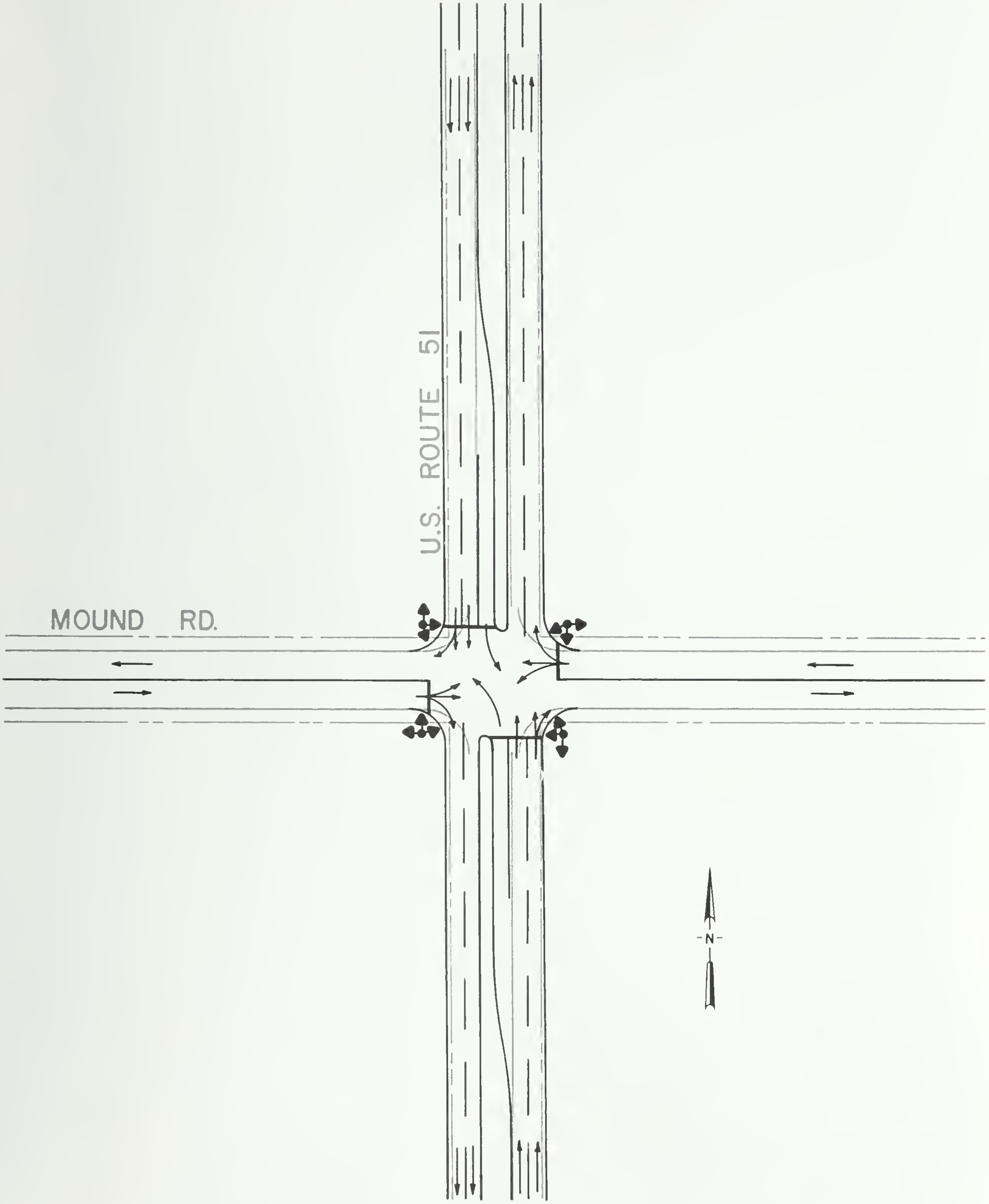
Intersection	Recommended Improvements	Benefits	Estimated Cost ($100's)			Comments
			ROW	Construction	Total	
36. SBI 121 and Taylor Avenue - (Continued)						
Taylor (S)	Install guardrail to prohibit access.	-	-	$ 20	$ 20	-
SBI 121 (E)	Install standard intersection warning sign.	-	-	1	1	
					$ 143	
37. SBI 121 and Westlawn Avenue	Illuminate intersection (two luminaires).	Provide adequate pavement and sight distance.	-	$ 4	$ 4	There is no lighting.
Westlawn (N and S)	Reconstruct approaches (22 x 150 feet); widen turn radius on NW corner; cut back natural growth on NE corner.	-	-	84	84	
					$ 88	
38. South Shore Drive and Franklin Street Road						
South Shore (N)	Replace FORM SINGLE LANE TO RIGHT sign with a sign showing FRANKLIN STREET ROAD and an appropriate arrow.	Provide sufficient warning and information regarding intersection configuration.	-	$ 1	$ 1	-
South Shore (SE)	Install KEEP RIGHT sign at south end of center median.					
					$ 1	
39. U.S. 36 and Country Club Road						
Country Club (N)	Construct right-turn lane (8 x 200 feet).	Increase capacity.	-	$ 44	$ 44	-
					$ 44	



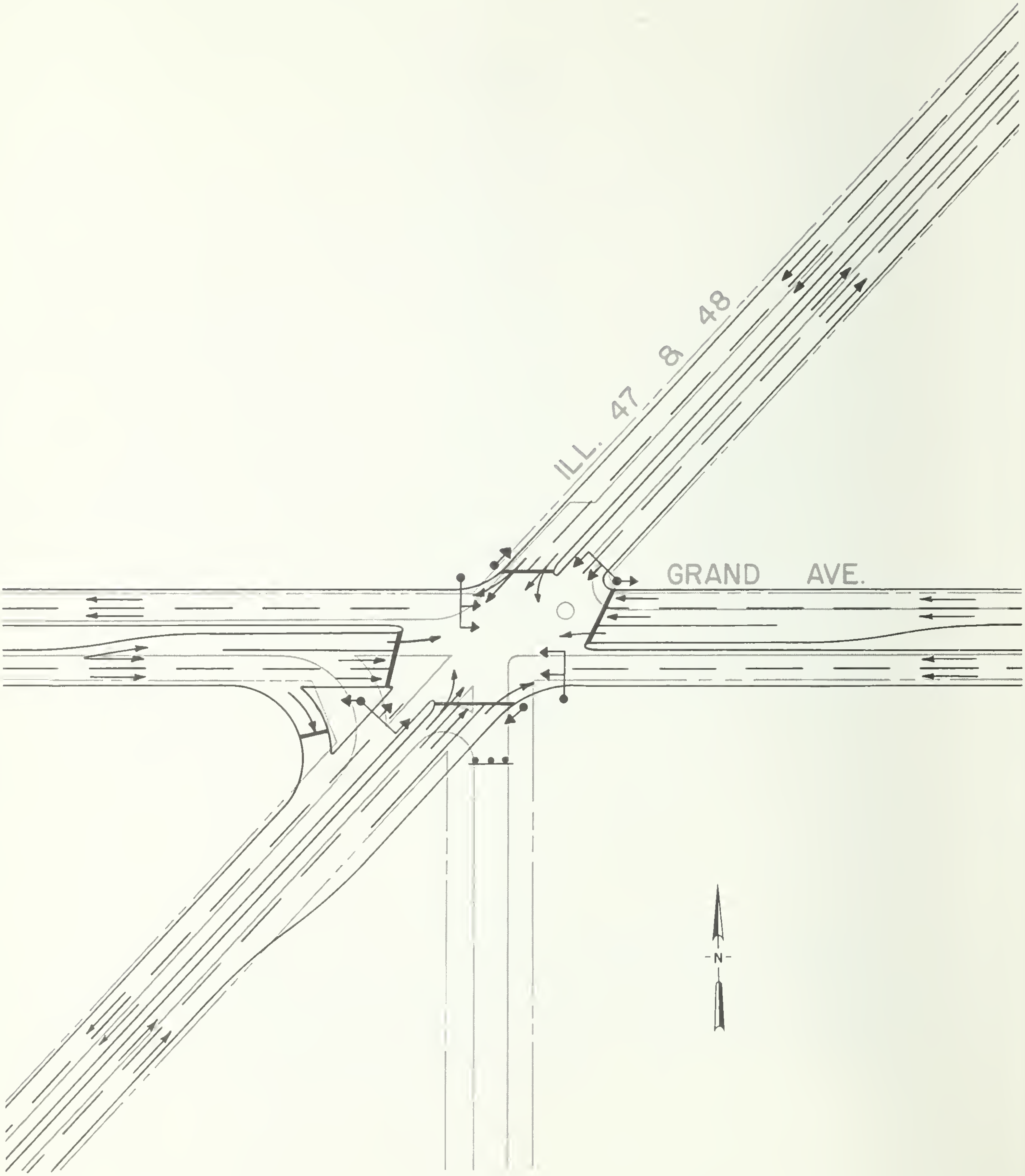
APPENDIX FIGURE 1:
MT. ZION ROAD AND U.S. ROUTE 36



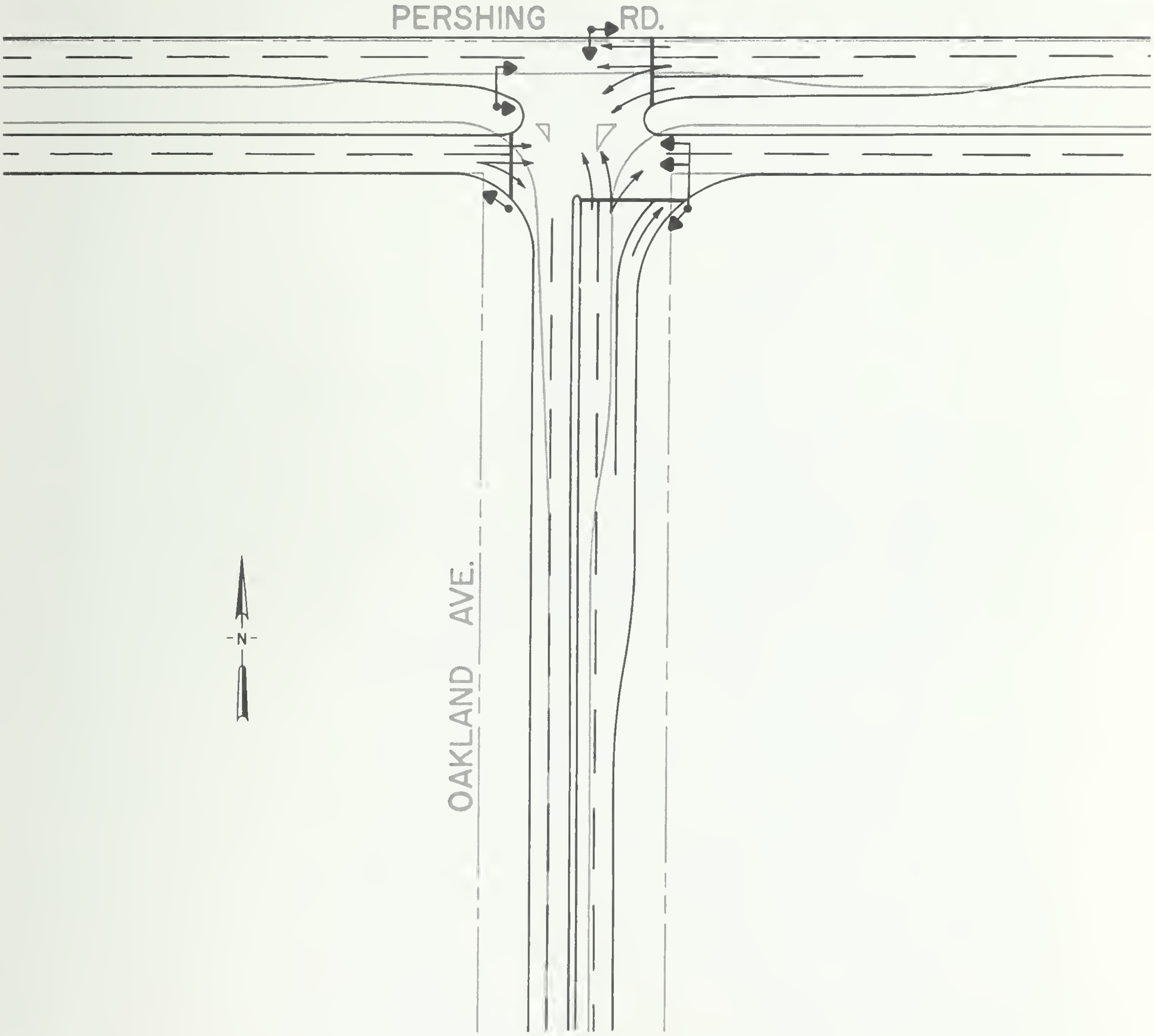
APPENDIX FIGURE 2:
RAVINA PARK ROAD AND OAKLAND AVENUE



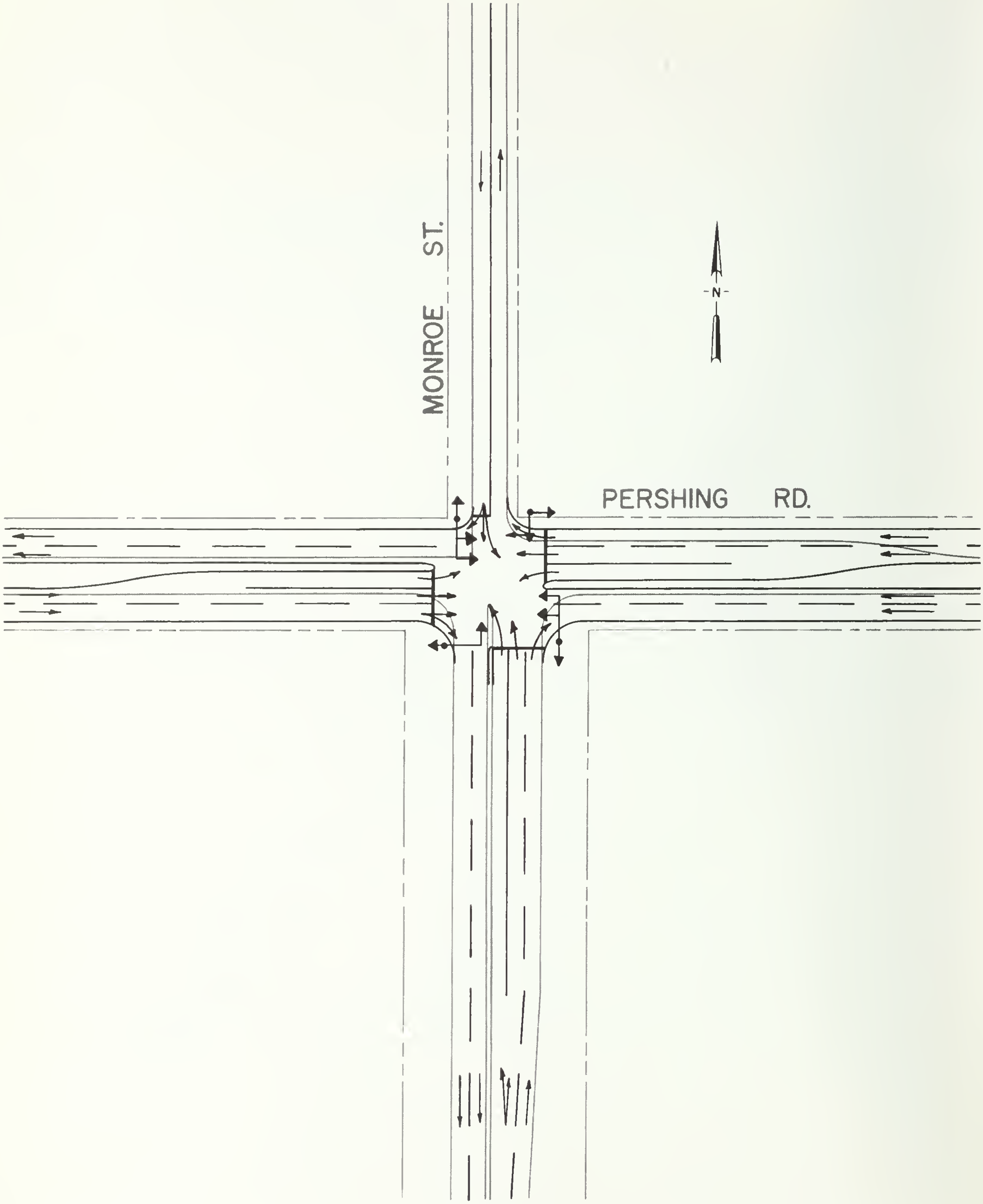
APPENDIX FIGURE 3:
U.S. ROUTE 51 AND MOUND ROAD



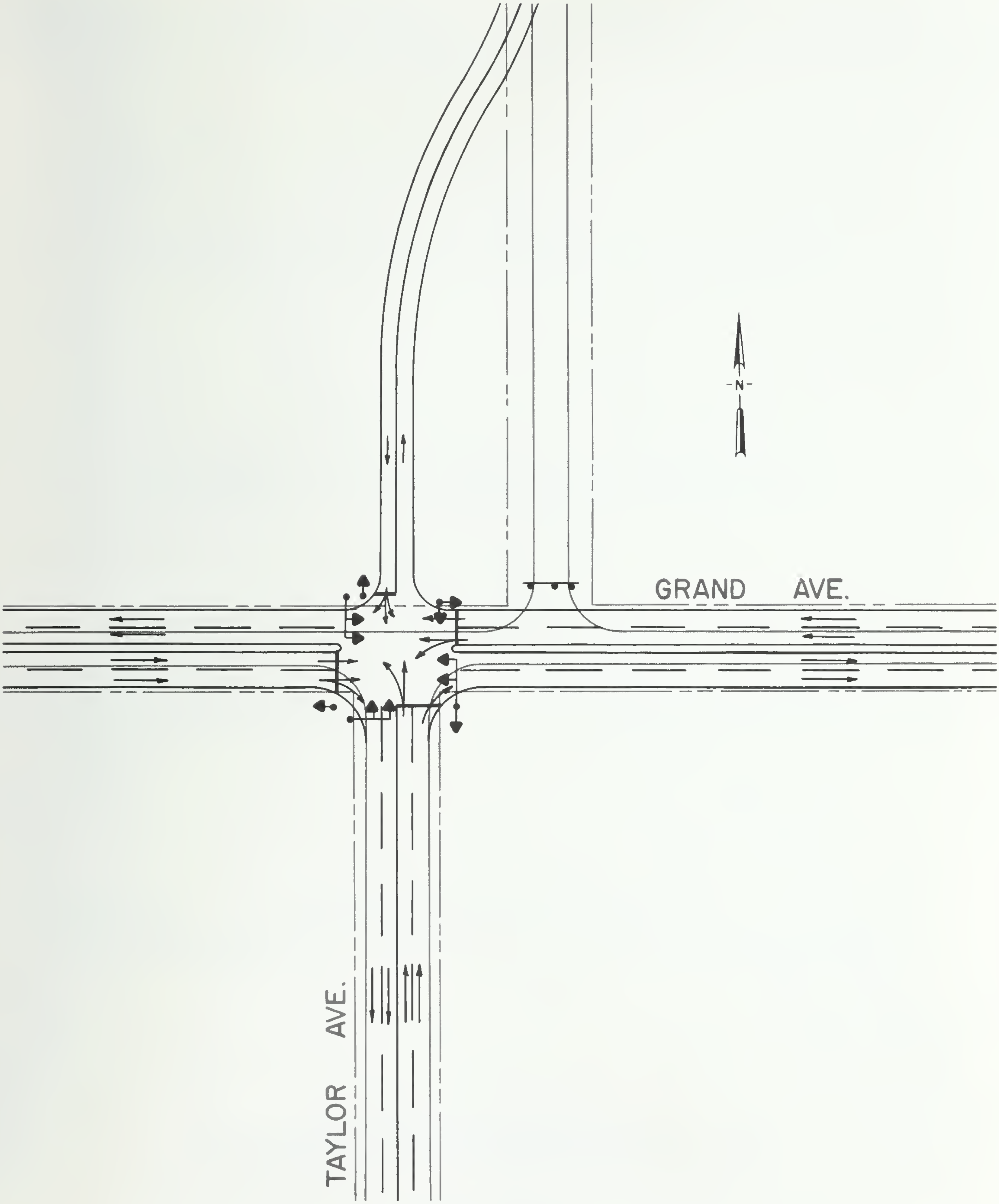
APPENDIX FIGURE 4:
GRAND AVENUE AND ILLINOIS ROUTES 47 AND 48



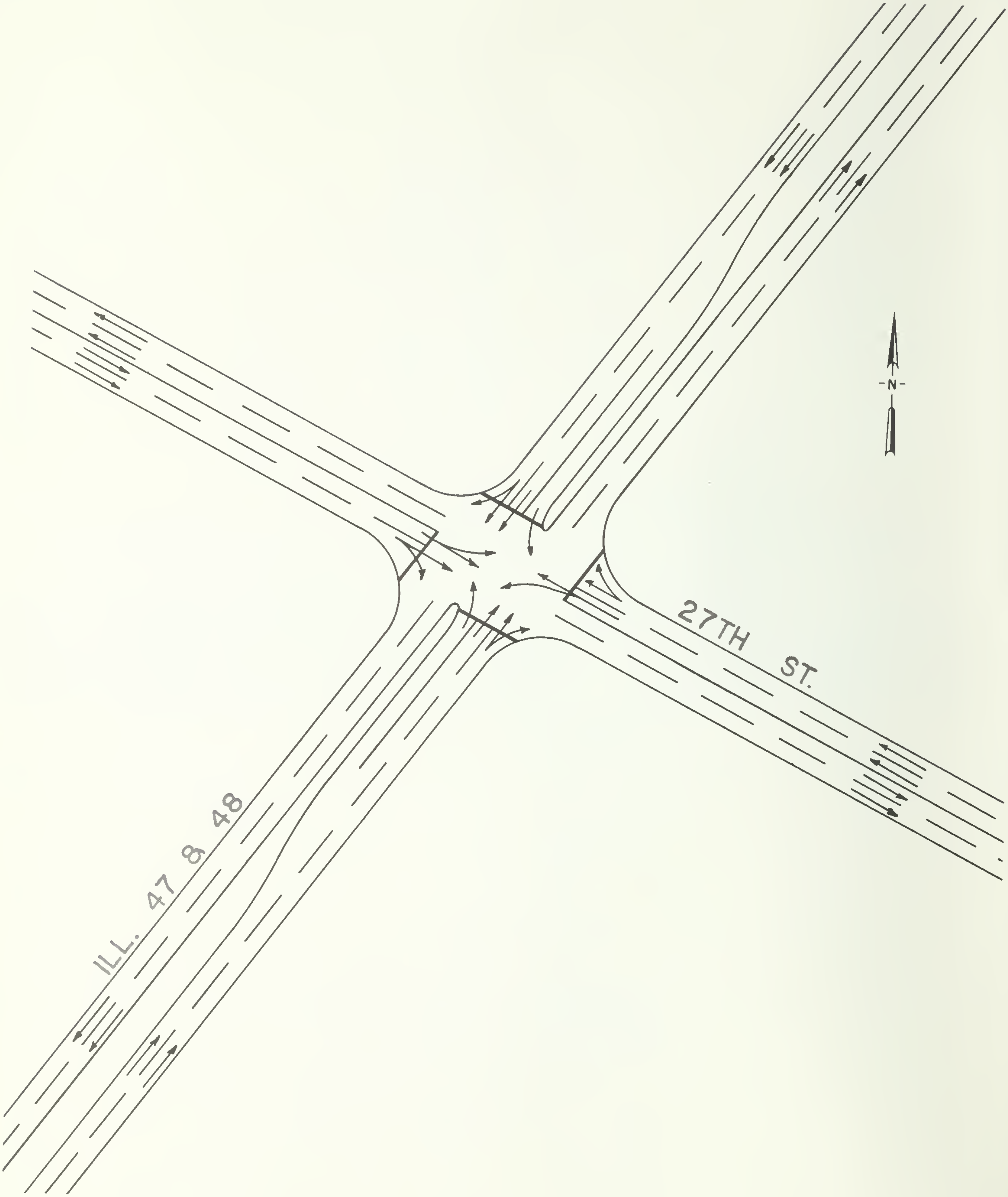
APPENDIX FIGURE 5:
OAKLAND AVENUE AND PERSHING ROAD



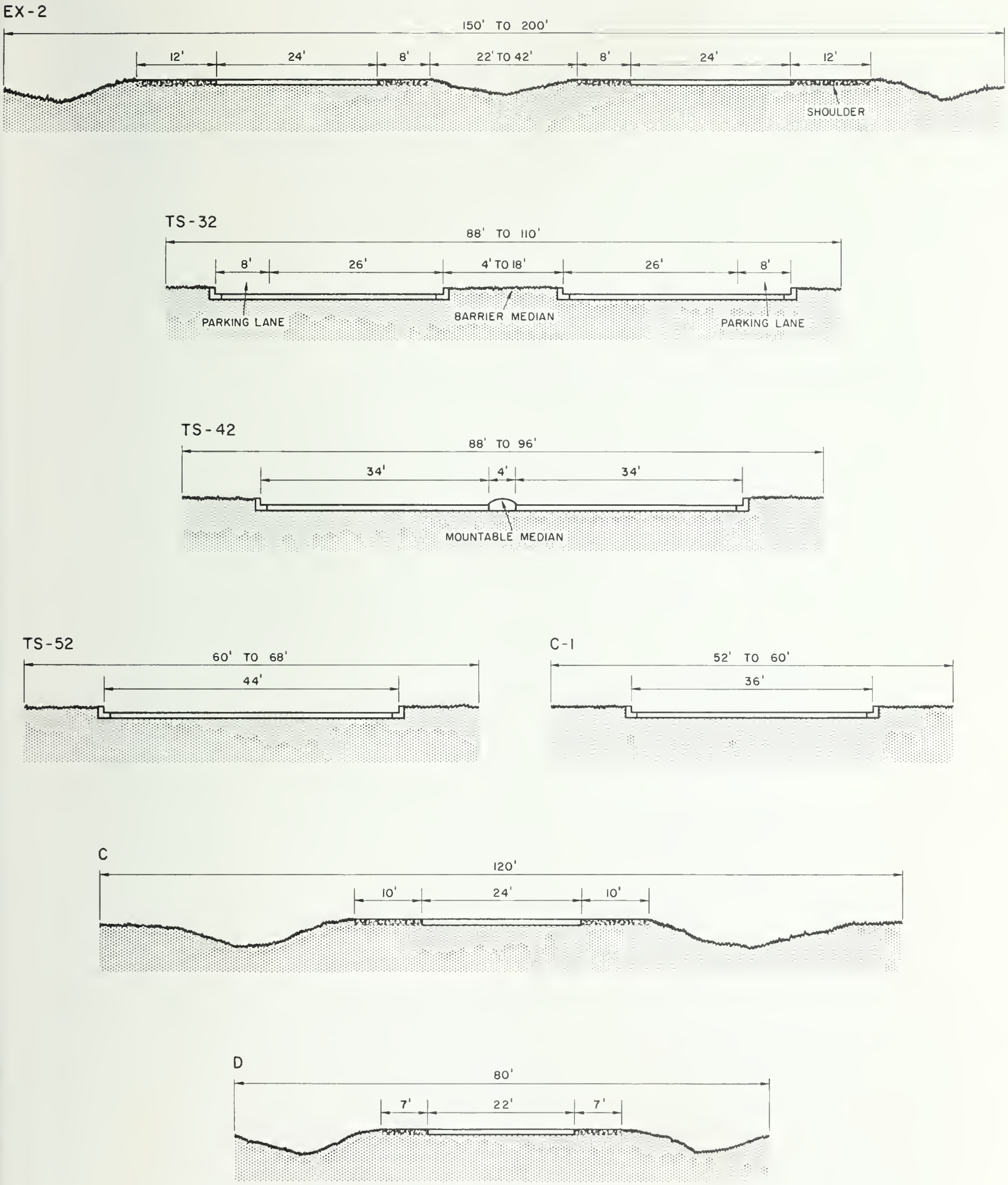
APPENDIX FIGURE 6:
MONROE STREET AND PERSHING ROAD



APPENDIX FIGURE 7:
TAYLOR AVENUE AND GRAND AVENUE



APPENDIX FIGURE 8:
ILLINOIS ROUTES 47–48 AND 27TH STREET



APPENDIX FIGURE 9:
TYPICAL CROSS SECTIONS

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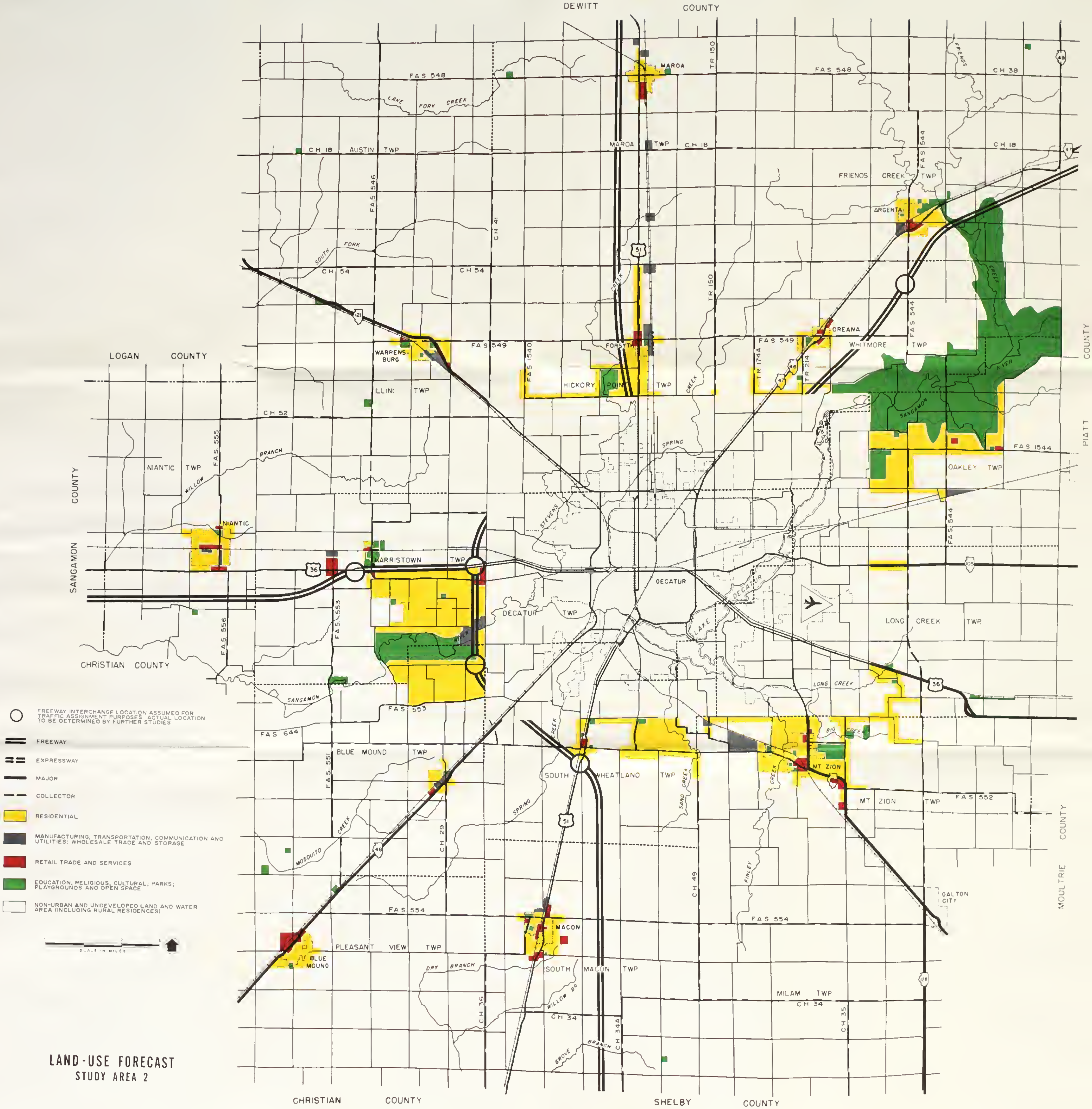

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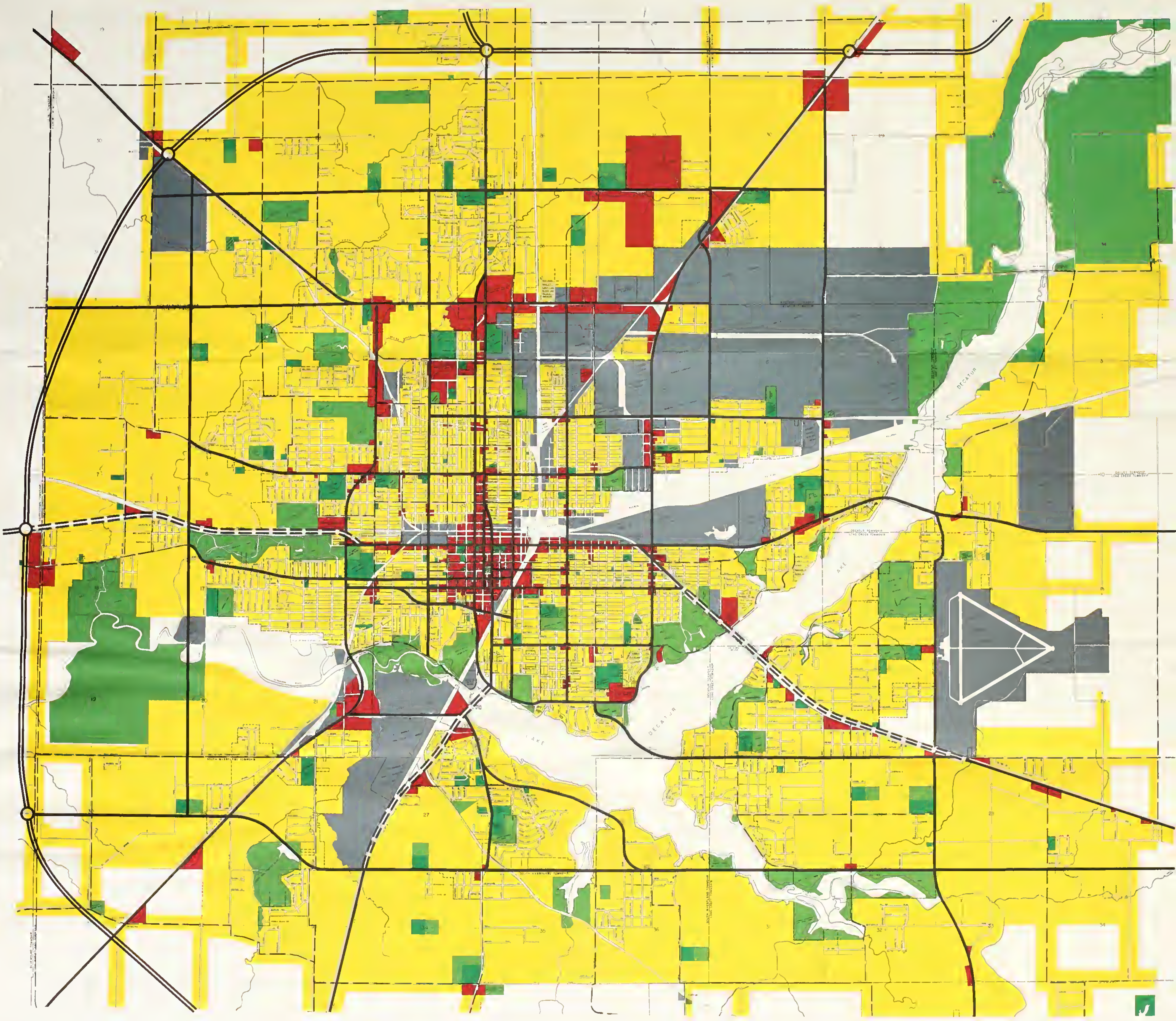
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FREEWAY INTERCHANGE LOCATION ASSUMED FOR TRAFFIC ASSIGNMENT PURPOSES. ACTUAL LOCATION TO BE DETERMINED BY FURTHER STUDIES
FREEWAY
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COLLECTOR
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TRANSPORTATION RIGHTS-OF-WAY
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NON-URBAN AND UNDEVELOPED LAND AND WATER AREA

LAND-USE FORECAST
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